Course Syllabus for CSE-143

1. Title: Object Oriented Programming

2. Credits: 3 (3 lectures of 50 minutes per week)   **Session:** 2019-20

3. Course Teacher: Omar Sharif, Lecturer, Dept. of CSE, CUET
                        Md. Billal Hossain, Lecturer, Dept. of CSE, CUET

4. Learning Resources:
   Textbook(s): E. Balagurusamy, -- Object Oriented Programming with C++ by Tata
   McGraw Hill Education Private Limited

   Reference:
   Herbert Schildt -- C++: The Complete Reference, Mcgraw-Hill Osborne Media; 4th edition

5. Catalog Description: Concepts of object oriented programming, Classes, Friend functions: Objects, isomorphism, polymorphism, inheritance, parameterized constructors, multiple inheritance, passing object to functions, arrays of objects, pointer to objects.

Function and operator overloading, overloading constructor functions, references, virtual functions, Exception Handling, Template functions and classes, Streams, Dynamic allocation, Static class members, Multi-threaded programming.

6. Prerequisite(s): None

7. Course Designation as Elective or Required: Required

8. Course Objectives:
   a) To study the object oriented programming (OOP) principles, tokens, expressions, control structures and functions.
   b) To introduce the classes, objects, constructors and destructors.
   c) To cover the operator overloading, inheritance and polymorphism concepts of OOP.
   d) To get familiar with memory management, multithreading, managing errors and exceptions and I/O Streams in OOP.
   e) To use a programming approach such as C++ established the above mentioned objectives.

9. Student Learning Outcomes: After successfully completing the course with a grade of D (2.0/4.0) or better, the student should be able to do the following:

No.	Course Learning Outcomes (CLOs)	POs#
1	Understand the features of C++ supporting object oriented programming	1
2	Understand the relative merits of C++ as an object oriented programming language while solving problems	2
3	Apply the major object-oriented concepts such as encapsulation, inheritance and polymorphism to implement object oriented programs in C++	3
4	Develop object-oriented software using C++	3
5	Understand advanced features of C++ specifically stream I/O, templates and multithread	1

10. Program Outcomes Addressed: 1, 2 and 3.

CLO#	Program Outcome (PO)	PO#
1 & 5	Engineering Knowledge	1
2	Problem Analysis	2
3 & 4	Design/Development of Solution	3

CLO—PO Mapping

No.	Course Learning Outcomes (CLOs)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	Understand the features of C++ supporting object oriented programming	X											
2	Understand the relative merits of C++ as an object oriented programming language while solving problems		X										
3	Apply the major object-oriented concepts such as encapsulation, inheritance and polymorphism to implement object oriented programs in C++			X									
4	Develop object-oriented software using C++			X									
5	Understand advanced features of C++ specifically stream I/O, templates and multithread	X											

11. Assessment Strategy: According to the Undergraduate Academic Rule of the University

Lesson Plan

with

Lesson Learning Outcomes (LLOs)

`	Topic	Lesson Learning Outcomes (at the end of the lesson students will be able to …)	Teaching-Learning Methodology	Assessment Method
Lesson-01	Overview and Importance of course CSE-143	• To summarize the learning outcome of this course. • To understand the necessity of this course.	Class Lecture	Not Applicable
Lesson-02	Introduction to Object-Oriented Programming (OOP)	• To describe the basic concepts of OOP. • To differentiate between OOP and other conventional programming paradigm.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-03	Continuation of Introduction to Object-Oriented Programming (OOP)	• To restate the basic features of OOP. • To identify the benefits and applications of OOP.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-04	Tokens	• To identify the tokens used in OOP. • To define constants. • To create variables. • To use various operators.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.

Lesson-05	Expressions and Control Structures	• To demonstrate type conversion. • To declare expression. • To illustrate the mechanism of various control structure.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-06	Function and its types	• To formulate function. • To reuse a user-defined function. • To compare and contrast various types of function declarations.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-07	Inline Function	• To recognize the benefits of inline function. • To use it.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-08	Function Overloading	• To perform function overloading.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Class Test-1				
Lesson-09	Class and Object,	• To describe the concept of class and object. • To create class and object. • To model the interaction between class and object	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-10	Static Data Member and Member class	• To implement static data member and class.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.

Lesson-11	References	• To use reference variables.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-12	Memory allocation	• To demonstrate dynamic memory allocation of variables and objects.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-13	Constructors	• To compare and contrast among various constructors such as default constructor, dynamic constructor, copy constructor etc.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-14	Parameterized Constructors, Constructor Overloading	• To outline the concept of constructor overloading	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-15	Destructors	• To identify destructors. • To state the importance of destructor.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-16	Operator Overloading	• To compose a new definition of operators. • To perform overloading of unary and binary operators.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-17	Continuation of Operator Overloading	• To contrast overloading of operators using different mechanism.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.

Class Test-2

Lesson-18	Data Encapsulation and Hiding	• To distinguish among public, private, and protected derivations.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-19	Inheritance and its types	• To explain inheritance and its importance.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz, Assignment etc.
Lesson-20	Continuation of Inheritance and its types	• To model various types of inheritance such as multiple inheritance, multilevel inheritance etc.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz, Assignment etc.
Lesson-21	Inheritance and Constructor-Destructor	• To illustrate how constructor destructor works in case of inheritance.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz, Assignment etc.
Lesson-22	Friend Function and Class	• To define the friend function and class. • To demonstrate the mechanism to access private and protected member using the keyword **friend**.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-23	Pointers	• To perform declaration, initialization and manipulation of pointers. • To use pointers to functions, objects. • To identify the significance of **this** pointer.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Class Test-3				
Lesson-24	Polymorphism	• To describe polymorphism. • To differentiate between run-time and compile-time polymorphism.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.

Lesson-25	Virtual Class	• To identify the functionality of virtual class. • To demonstrate it.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-26	Virtual Function	• To define virtual function. • To use it.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-27	Pure Virtual Class and Abstract Class	• To define pure virtual class and abstract class. • To compare them.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-28	I/O Operation	• To apply stream classes for console operations.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz, Assignment etc.
Lesson-29	Continuation of I/O Operation	• To use manipulator using I/O • To create inserters and extractors.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz, Assignment etc.
Lesson-30	File I/O	• To perform different type of manipulation in file.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz, Assignment etc.
Lesson-31	Continuation of File I/O	• To perform text formatting while writing in a file.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz, Assignment etc.

Class Test-4

Lesson-32	Templates	• To describe generic programming. • To define template classes. • To compose template class with multiple parameter.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-33	Continuation of Templates	• To explain function template. • To create function template with multiple para meters. • To apply overloading of template function.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-34	Exception Handling	• To describe the basics of exception handling. • To understand try-catch-throw paradigm.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-35	Continuation of Exception Handling	• To recognize exceptions. • To identify uncaught exceptions.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz etc.
Lesson-36	Multi-threaded programming	• To perform thread creation and termination. • To apply argument passing to thread. • To label joining and detaching of threads.	Multimedia Presentation , Question and Answer	Test, Exam, Quiz, Assignment etc.
Lesson-37				
Lesson-38	Makeup classes	• Review of the course		Test, Exam, Quiz, Assignment etc.
Lesson-39				