National University of Computer & Emerging Sciences, Karachi
Spring 2021 CS-Department
CS 217 – Object-oriented Programming

Course Learning Outcomes (CLOs):

CLO 1: Acquire knowledge of underlying concepts of object oriented paradigm like abstraction, encapsulation, polymorphism, inheritance etc.

CLO 2: Interpret real world problems in terms of objects rather than procedure.

CLO 3: Develop an understanding of Object-Oriented design artifacts and their mapping to Object-Oriented Programming using C++.

CLO 4: Apply object-oriented programming principles to implement small and medium scale C++ / C# programs.

CLO 5: Implement Generic Programming Concepts and exception handling.

Course Outline:

Week	Topic	Lab Topic	Assessment
1	Introduction to OO paradigm	Introduction to IDE, skeleton of C++ program, pointers, array, basic I/O in C++	**Announce project proposals in 2nd week and submissions in 3rd week** At least 2 Assignment
	Comparison from sequential & procedural paradigms		
	Data Abstraction		
2	Encapsulation	C++ data types, functions, struct revisited	
	Introduction to Objects in real world		
3	Introduction to classes and objects	Classes & Objects	
	Access Control		
	Constructors & its types		
4	Destructor	Working with classes and constructors	
	Implicit and explicit casting		
	Member initialization list & constants		
5	Static data and member functions Inline functions	Working with access modifiers, static and constant keywords, some examples to revise concepts of classes and objects, constructors & destructors (before Mid 1)	
Mid I Exam			
6	Inheritance	Working with Static functions, constants, constant function and member initialization list	
	Types of inheritance		
	Data and code hiding		
7	Polymorphism in OOP	Inheritance	
	Function overloading		
	Function overriding		
8	Friend function		

	Operator overloading	Polymorphism, Function overloading and overriding	At least 2 assignments
9	Multiple inheritance & its issues (Diamond Problem) Virtual inheritance Virtual functions	Friend classes, Friend functions, operator overloading	
10	Abstract classes & Interfaces	Abstract Classes and virtual functions	
11	Introduction to filing	Multiple inheritance, virtual keyword, abstract class	
Mid II Exam			
12	Generics Introduction to exception handling	Project Submission & Project demo	**Project Submission in 12th LAB**
13	Introduction to C# Properties in C# GUI	Filing and I/O stream Working with template functions and template classes	
14	Linking window forms & Exception handling in C#	Final lab exam	
15	Revision		**Finalized Sessional Marks for both Theory and Labs**
Final Exam			

Course Coordinator:

Dr. Abdul Aziz

Course Instructor:

Mr. Syed Zain-ul-Hassan, Mr. Basit Jasani, Mr. Behraj Khan, Ms. Nida Munnawar, Mr. Qaiser Abbas

Lab Instructor:

Mr. Sohail Afzal, Mr. Qaiser Abbas, Mr. Ali Fatmi, Mr. M. Fahim, Ms. Romesha, Ms. Nida Munawwar, Ms. Abeer Gouhar

Books:

1- "Problem Solving with C++", 9e Global Edition, Walter Savitch, ISBN-13:9781292018249, Addison-Wesley, 2015.
2- C++ How to program By Deitel & Deitel.

Reference Books:

1- The C++ Programming Language by Bjarne Stroustrup.
2- Object Oriented Software Engineering by Jacobson.
3- C# 4.0: The Complete Reference by Herbert Schildt

Marks Distribution

For Theory:

Assignments	10%
Course Project	10%
Mid Exam	30% (15% each)
Final Exam	50%
Total	**100**

For Lab:

Lab Activities	20%
Lab Mid exam	20%
Course Project	10% (including viva exam & report)
Lab Final Exam	50%
Total	**100**