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

**Course Outline**

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| **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**  2 Assignments |
| 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 | Declaring classes & creating objects |
| Access Control |
| Constructors & its types |
| 4 | Destructor | Working with classes and  constructors (initializing class data members) |
| Implicit and explicit casting |
| Member initialization list & constants |
| 5 | Static data and member functions | Access modifiers with data and functions |
| Inline functions |
| **Mid I Exam** | | |  |
| 6 | Inheritance | Working with constants and member initialization list | 3 Assignments |
| Types of inheritance |
| Data and code hiding |
| 7 | Polymorphism in OOP | Working with static variables and functions |
| Function overloading |
| Function overriding |
| 8 | Friend function | Inheritance |
| Operator overloading |
| 9 | Multiple inheritance & its issues (Diamond Problem) | Function overloading and overriding |
| Virtual inheritance |
| Virtual functions |
| 10 | Abstract classes & Interfaces | Friend function, operator overloading |
|  |
| 11 | Introduction to filing | Multiple inheritance, virtual keyword, abstract class |
| **Mid II Exam** | | |  |
| 12 | Generics | Project Submission & Project demo | 1 Assignment  Project Submission in LAB |
| Introduction to exception handling |
| 13 | Introduction to C# | Filing and I/O stream,  Working with template functions and template classes |
| Properties in C# |
| GUI |
| 14 | Linking window forms & Exception handling in C# | Final lab exam |  |
| 15 | Revision |  | **Finalized Sessional Marks for both Theory and Labs** |
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| **Final Exam** | | |  |

**Course Instructor: Mr. Behraj Khan email:** [**Behraj.khan@nu.edu.pk**](mailto:Behraj.khan@nu.edu.pk)

**Google meet code: df26zlbbxa**

**Google class code:** **2amrzuo**

**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 15%

Course Project 15-20%

Mid Exam 20% (10% each)

Final Exam 50%

**Total 100**