Fast**National University of Computer & Emerging Sciences, Karachi  
Spring 2022 CS-Department  
CS 1004 - Object-oriented Programming (SE/AI)**

**Course Outline**

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| **Week** | **Topic** | **Lab Topic** |
| 1 | Introduction to OO paradigm | Introduction to IDE, skeleton of Java program, basic I/O in Java, working with Data types |
| Comparison from sequential & procedural paradigms |
| Data Abstraction and encapsulation concepts |
| 2 | Introduction to classes and objects, instance variables, and instance methods | Java operators, math class in Java, control structures, iterative structures. |
| Introduction to Objects in real world |
| Java API and Package/Library methods |
| 3 | User-defined methods , Access Control | Classes and objects |
| Set (mutator), Get (access), and predicate methods |
| Constructors & its types |
| 4 | Finalizers, garbage collection | Constructors & destructors |
| Argument promotion & casting |
| this reference |
| 5 | Static data and member functions | Static data, static functions, arrays in java and array lists. |
| Inheritance |
| Revision |
| **Mid I Exam** | | |
| 6 | Types of inheritance, Super class, subclass | Data casting, object casting, inheritance in java |
| Data and code hiding, Relationships in inheritance |
| Polymorphism in OOP |
| 7 | Function overloading | Working with multiple classes (some case studies that covers the concept of super and sub classes, object and data casting, encapsulation and data hiding) + Aggregation + association + composition |
| Dynamic method binding / Function overriding , Final keyword |
| Abstract class and Concrete class |
| 8 | Inner class definition | Polymorphism + Abstract and concrete class scenarios |
| Interfaces |
| Exception Handling |
| 9 | Exception Handling examples | Interfaces + nested classes + containership |
| Generics in Java |
| Generics examples |
| 10 | Introduction to filing in Java | Exception Handling and Generics |
| Streams in Java |
| Files and stream Example |
| **Mid II Exam** | | |
| 11 | Event-Driven Programming and Event Handling Model | Files + streams + practice questions for basic GUI components |
| Window Components in detail using AWT, Jframes and intro to swings, using working examples. |
| 12 | Window Components continue, SDI, MDI | Developing a small GUI application |
| Mouse and keyboard event handling |
| Working example |
| 13 | Adapter classes | Working with the application developed in previous lab (12). Incorporating mouse and keyboard events, layout mangers etc. |
| Layout managers |
| Intro to Applets |
| 14 | Applets example | Project demo |
| Linking Database an Example |
| Some more examples for discussion |
| 15 | Revision | Final lab exam |
| **Final Exam** | | |

**Books:**

1. "Java How to program", 8th or higher Edition, Deitle & Detile, ISBN-978-81-203-3832-6, PHI learning Pvt.Ltd.

**Reference Books:**

1. Beginning Java 2 by Ivor Horton, Wrox Beginning Guides.
2. Java, The complete reference. Oracle publication.

**Marks Distribution**

***For Theory:***

Assignments 10 (at least 3. First in week 4, second week 7 and third week 11)

Quizzes 10 (at least 3. First week 3, second week 7, third week 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**