LOVELY PROFESSIONAL UNIVERSITY

# CSE310
# Programming in Java

## The kick-start session

Lecture #0

# Programming in JAVA

- Course Code - CSE310
- LTP – 3 0 2 [5 Hours/Week]

**Note: Laptop is compulsory.**

# Course Outcomes

- explain basic constructs of Java programming and apply them to solve the real-world problems
- illustrate the Object-oriented programming principles to write efficient and reusable codes.
- demonstrate the concept of inheritance to reuse and extend the features of existing class with access control
- create the uses of abstract classes, interfaces and Lambda expressions
- manage errors and perform I/O operations using exception handling and file streams.
- utilize collections, generics, and JDBC for advanced Java applications.

# Program Outcomes achieved from the course

- Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

# Skillset

- Programming Skills
- Code analysis

# Course Contents

**Unit I**

- **Introduction to Java:** History and Features of Java, Java program structure, Writing simple Java class and main() method, Command-line arguments, Understanding JDK, JRE, and JVM
- **Data In the Cart:** Using primitive data types, Type conversion, Keywords, Identifiers, Variables, Access modifiers, static keyword, Wrapper class
- **Operators:** Working with Bit-wise, arithmetic, logical, and relational operators, Unary, assignment, and Ternary operator, Operator precedence Conditional Statements: Using if/else constructs and switch-case statements

**Unit II**

- **Loops:** Working with for loop, while loop, do-while loop, and for-each loop
- **Arrays and Enums:** Fundamentals about Arrays, Multi-dimensional arrays, Array Access and Iterations, Using varargs, Enumerations
- **OOP Concepts:** Basics of class and objects, Writing constructors and methods, Overloading methods and constructors, this keyword, initializer blocks String Class : Constructors and methods of String and String Builder class

# Course Contents

**Unit III**

- **Inheritance and Polymorphism:** Inheritance, Method overriding, super keyword, Object class and overriding toString() and equals() method, Using super and final keywords, instanceof operator.
- **Abstract Class and Interface:** Abstract method and abstract class, Interfaces, static and default methods.

**Unit IV**

- **Nested Class and Lambda Expressions:** Nested Class, Understanding the importance of static and non-static nested classes, Local and Anonymous class, Functional Interface, Lambda expressions
- **Utility Classes:** Working with Dates
- **Exceptions and Assertions:** Exception overview, Exception class hierarchy and exception types, Propagation of exceptions, Using try, catch, and finally for exception handling, Usage of throw and throws, handling multiple exceptions using multi-catch, Autoclose resources with try-with-resources statement, Creating custom exceptions, Testing invariants by using assertions

# Course Contents

**Unit V**

- **I/O Fundamentals:** Describing the basics of input and output in Java, Read and write data from various sources, Using streams to read and write files, Writing and read objects using serialization
- **Generics:** Creating a custom generic class, Using the type inference diamond to create an object, Using bounded types and Wild Cards.

**Unit VI**

- **Collections** Creating a collection by using generics, Implementing an ArrayList, Implementing TreeSet using Comparable and Comparator interfaces, Implementing a HashMap, Implementing a Deque.
- **Database Programming using JDBC** Introduction to JDBC,JDBC Drivers, CRUD operation Using JDBC, Connecting to non-conventional Databases.

# Course Assessment Model

| **CSE310** | **Marks break up*** |
|---|---|
| Attendance | 5 |
| Daily Practice Problems | 15 |
| CBT (One best out of Two CAs) online | 15 |
| Written Test | 20 |
| ETP | 45 |
| **Total** | **100** |

# Academic Tasks

| Academic Task | Tentative Week |
|---|---|
| CA-1: Programming Practice (MCQs + Coding) (Mandatory) | Week1 – Week14 |
| CA-2: Test - Code based 1 [MCQs(10 Marks) + Coding Problems(20 Marks)] | Week 5 |
| CA-3: Test - Code based 2 [MCQs(10 Marks) + Coding Problems(20 Marks)] | Week 10 |
| CA-4: Written Test (Mandatory) | Week 12 |

# Programming Practice

## Sequence locking:

Problems will be opened unit-wise with the previous odd unit getting locked with the next odd opening and even Units getting locked with the next even unit opening.

**For example,** at the time of opening of the 3rd unit, the marks for the 1st unit will be frozen and at the time of opening the 4th unit, the marks for the 2nd unit will be frozen.

# Marks Calculation for Programming Practice

In order to qualify for programming practice marks, the student should solve at least **50% of the programming and 50% of MCQ questions (**eligibility condition).
The maximum marks out of **15 marks** for which the student would be eligible for Programming Practice would be based on the Percentage of questions solved by the student.
The final marks for Programming Practice would be calculated by prorating the eligible marks for which the student is eligible (as explained in the above point) with the percentage of marks the student has scored in the proctored Coding Contests conducted as CA's along with the mandatory written test. (The final marks would be rounded up for the students).

**Marks is only for Coding Problems**

# Marks Calculation for Programming Practice

- **Example** – If a student solves 72 questions out of 90 questions (i.e. 80% of questions solved) then the student would be eligible for 80% of 15 marks which is 12 marks (round-up would be used in case of decimal values).
- And if the student has scored 24 out of 30 in the other CA's i.e. 80% marks in CA, his Programming practice final marks would be 80% of 12 marks that he was eligible for which is 9.6 rounded up to 10 marks out of 15 for Programming Practice.

# Daily Practice Problems

| S. No | Unit | Question | Tentative Dates for Completion |
|---|---|---|---|
| 1 | Unit-1 | 15 Multiple Choice Questions and 15 Practical Implementation problems and 5 Static Problems in each unit | 29th JAN 2025 |
| 2 | Unit-2 | | 16th FEB 2025 |
| 3 | Unit-3 | | 3rd MAR 2025 |
| 4 | Unit-4 | | 30th MAR 2025 |
| 5 | Unit-5 | | 15th APR 2025 |
| 6 | Unit-6 | | 2rd MAY 2025 |

Note:- Most Important for the improvement of Performance in Course Assessments.

# Written Test

A written test, consisting of questions such as “filling in the missing code,” is also a mandatory component. The weightage of the written test will be 20%.

# End Term Practical (45 Marks)

- Coding Problems and MCQs [30%]
- Written Test [30%]
- Viva [40%]

Note:- The assessment marks (Coding + MCQs) of online platforms in ETP, will be prorated as per their viva marks and written marks collectively if the student scores less than 60% in the viva and written exam.

Example: If the student scores 20 marks out of 40 in viva and 15 out of 30 on a written test that is 50% and in an online test student scores 18 out of 30 which is 60% so the final marks awarded to the student in the online test will be 50% of 18 that is 9/30

# Certifications

- Java SE 8 Certification (Oracle Certified Associate)
- Exam Code: 1Z0-808
- Cost: Rs 21600/- Approximately
- Link: https://mylearn.oracle.com/ou/learning-path/java-se-8-programmer-associate/40821

**Complete Course Waived-off**

# Textbooks and Reference

- **Text Book:**

  PROGRAMMING WITH JAVA: A PRIMER by E. BALAGURUSAMY

- **Reference Books:**
  - INTRODUCTION TO JAVA PROGRAMMING by Y. DANIEL LIANG
  - JAVA THE COMPLETE REFERENCE by HERBERT SCHILDT

- Reference material by IamNeo Platform

# OER- Open Educational Resources

| Unit mapped | Broad topic/Sub Topic | OER Type | Title of OER | *%age unit mapped with OER (approx) | Source URL |
|---|---|---|---|---|---|
| **Unit-1** | Introduction to Java, Data In the Cart, Operators, Conditional Statements | Reading Material | Java Tutorial | 100% | https://www.javatpoint.com/java-tutorial |
| **Unit-2** | Loops, Arrays and Enums, OOP Concepts, String Class | Reading Material | Java Tutorial | 75% | https://www.javatpoint.com/java-tutorial |
| **Unit-3** | Inheritance and Polymorphism, Abstract Class and Interface | Reading Material | Java Tutorial | 80% | https://www.javatpoint.com/java-tutorial |
| **Unit-4** | Nested Class and Lambda Expressions, Nested Class, Utility Classes, Exceptions and Assertions | Reading Material | Java Tutorial | 80% | https://www.javatpoint.com/java-tutorial |
| **Unit-5** | I/O Fundamentals, Generics | Reading Material | Java Tutorial | 90% | https://www.javatpoint.com/java-tutorial |
| **Unit-6** | Collections, Database Programming using JDBC | Reading Material | Java Tutorial | 75% | https://www.javatpoint.com/java-tutorial |

# Why Star Course?

- Industry demand
  - Product Based
  - Service Based

# Execution strategy

| Topic: Activities | Details of the Activities Planned | Is this Activity a part of Evaluation (Yes/No): Which CA/MTE/ETE | Tentative week of conduct of activity | Responsibility: Who will ensure the conduct of the activity (specify the plan for the same) | Expected Outcome |
|---|---|---|---|---|---|
| **First Continuous Assessment** | The continuous assessment will be planned as a coding test consisting of 2 coding questions and 10 MCQs on an online judge. | Yes | 5 | The concerned subject teacher will ensure the smooth conduct of the activity. | Evaluation and reiteration of the taught concepts. |
| **Second Continuous Assessment** | The continuous assessment will be planned as a coding test consisting of 2 coding questions and 10 MCQs on an online judge. | Yes | 10 | The concerned subject teacher will ensure the smooth conduct of the activity. | Evaluation and reiteration of the taught concepts. |
| **Third Continuous Assessment** | The continuous assessment will be planned as a written test. | Yes | 12 | The concerned subject teacher will ensure the smooth conduct of the activity. | Evaluation and reiteration of the taught concepts. |

# Execution strategy

| | | | | | |
|---|---|---|---|---|---|
| **End Term Practical** | **Assessment will be conducted on a third-party platform consisting of coding problems and a written test, followed by a viva with a neutral examiner.** | **Yes** | **After 14th week** | **Will be planned by the examination division** | **Evaluation and test the overall learning** |
| **Software Mapping** | NetBeans/Online Compiler will be used for the live coding demonstration during the classes | Yes | 1st class onwards | The concerned subject teacher will use the platform from 1st lecture onward in their classes for reference | Hands-on the software |
| **Use of third party platform for evaluation** | All the assessments including ETP and Programming practice will be done on third party platform | Yes | Student will solve the coding problems and MCQs on the third party platform all the assessments | The concerned subject teacher will ensure the smooth conduct of the activity. | Use of the third-party platform in assessment to improve the skills |

# Next Class: Introduction to Java