# **CSE310:PROGRAMMING IN JAVA**

L:3 T:0 P:2 Credits:4

**Course Outcomes:** Through this course students should be able to

CO1 :: explain basic constructs of Java programming and apply them to solve the real-world problems

CO2 :: Illustrate the Object-oriented programming principles to write efficient and reusable codes.

CO3 :: demonstrate the concept of inheritance to reuse and extend the features of existing class with access control

CO4:: contrast the uses of abstract classes, interfaces and Lambda expressions

CO5 :: use of exception handling and input/output techniques to improve the robustness and reliability of Java applications

CO6 :: integrate collections and generics to ensure clean, robust, and maintainable Java code

#### 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 yarargs, 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

### **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, Using Swing Components to demonstrate inheritance

# **Unit IV**

Functional Interface and Lambda Expressions: Using Lambda expressions, Implementing Threads using Lambda expressions, Implementing Listener using Lambda expressions

**Nested Class**: Understanding the importance of static and non-static nested classes, Local and Anonymous class

**Utility Classes**: Working with Dates

# Unit V

**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

I/O Fundamentals: Describing the basics of input and output in Java, Read and write data from the console, Using streams to read and write files, Writing and read objects using serialization

# **Unit VI**

**Collections and Generics**: Creating a custom generic class, Using the type inference diamond to create an object, Using bounded types and Wild Cards, Creating a collection by using generics, Implementing an ArrayList, Implementing TreeSet using Comparable and Comparator interfaces, Implementing a HashMap, Implementing a Deque

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# **List of Practicals / Experiments:**

#### **Exception Handling**

 Program to demonstrate the use of all the keywords used for exception handling and need of assertion

### Multithreading

• Program to implement multithreading using Lambda Expressions.

#### Creating a Java Main Class

• Program to implement a java class.

# **Managing Multiple Items**

• Program to demonstrate the use of list of items.

# **Describing Objects and Classes**

• Program to demonstrate the instantiation of class and accessing the attributes using object of class.

# Manipulating and Formatting the Data in Your Program

Program to demonstrate the uses of String and StringBuilder

# **Using Inheritance**

• Program to demonstrate the inheritance and its importance using Swing Components.

### Overriding Methods, Polymorphism, and Static Classes

• Program to implement polymorphism and using proper access control.

#### **Abstract and Nested Classes**

· Program to demonstrate the use of abstract class and nested class.

#### Java IO

Program to implement read and write operation using console and File.

**Text Books:**1. PROGRAMMING WITH JAVA: A PRIMER, 4E by E. BALAGURUSAMY, MCGRAW HILL EDUCATION

References: 1. INTRODUCTION TO JAVA PROGRAMMING by Y. DANIEL LIANG, PEARSON

2. JAVA THE COMPLETE REFERENCE by HERBERT SCHILDT, MCGRAW HILL EDUCATION

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