

3/4 B.Tech. FIRST SEMESTER

FE OBJECT ORIENTED PROGRAMMING THROUGH JAVA Credits: 4

Lecture: 4 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Objectives:

- To Describe the principles of the object oriented programming paradigm and terminology
- To introduce students with Core Java Concepts and to teach students the basic concepts of java programming.
- To discuss the Fundamental features of Java: objects, classes and interfaces, exceptions ,Multi threading and libraries of object collections
- To demonstrate encapsulation, inheritance and polymorphism through problem analysis and how they relate to the design of methods, abstract classes and interfaces.
- To Introduce reading and writing both character and binary data using Java I/O API
- To discuss the concepts of java API through programming and teach students how to programme swings in Java

Outcomes:

Students will be able to:

- Understand the concepts of Object Oriented Programming
- Identify classes, objects, members of a class and the relationships among them needed for a specific problem.
- Design, develop, test, and debug programs using object oriented principles
- Learn the concept of Java Collection API as well as the Java standard class library for various features in java.
- Understand and implement concurrent processing concepts through synchronization and serialization.
- Understand the event-based GUI handling principles and Develop a GUI interface using Java swings concept

Syllabus:

UNIT I

Oops basics:

OO Programming principles & Paradigms, Classes and Objects, Design Strategies in OOP (Coupling and Cohesion), defining state and behavior of a class.

JAVA BASICS:

History, advantages, purpose, Data types, variables, scope and life time of variables, operators, expressions, control statements, type conversions rules (type casting), methods and recursion, sample program.

UNIT II

JAVA ANATOMY:

Java Objects and References, Constructors, this keyword, garbage collection,

HANDLING STRINGS: String and its immutability, Buffer & Builder Classes, String Tokenizer. Wrapper Classes and Auto Boxing.

ARRAYS (SINGLE AND MULTI-DIMENSIONAL): Classification of Arrays, Creation, Reading and Writing, and Initialization of Arrays, Features of Arrays, Passing Array as a Parameter, Applications of Arrays. Handling multi- dimension arrays.

UNIT III

INHERITANCE:

Introduction, Derived Classes, Advantages of Inheritance, Types of Inheritance, Implementation, Inheritance and Member Accessibility. Constructors in Derived Classes, sequence of inherent constructor calling - rules Overriding and Hiding Fields and Methods, keyword Super, Abstract classes and Methods, the Final Classes and Final Methods, Java Class Hierarchy, Dynamic Binding, Polymorphism.

UNIT IV

PACKAGES, INTERFACES, ANNOTATIONS

PACKAGES:

Defining, Creating and Accessing a Package, Understanding CLASSPATH, Importing Packages, Access Controls (Public, Protected, Default, and Private).

INTERFACES:

Differences Between Classes and Interfaces, Defining An Interface, Implementing Interface, Applying Interfaces, Variables In Interface and Extending Interfaces.

UNIT V

EXCEPTION HANDLING AND MULTITHREADING:

Concepts of Exception Handling, Benefits Of Exception Handling, Termination or Presumptive Models, Exception Hierarchy, Usage Of Try, Catch, Throw, Throws And Finally, Built In Exceptions, Creating Own Exception Sub Classes. Differences Between Multi Threading and Multitasking, Thread Life Cycle, Creating Threads, Synchronizing Threads, Daemon Threads.

UNIT VI

IO FUNDAMENTALS:

Data read and write: Character and binary Data. IO API – Input and Output Streams their hierarchy, Readers and Writers. File IO, Read and Write from/into sockets.

Object Serialization: Object Input/output Streams, serializable interface, Effects of inheritance on serialization, Console Class in IO Package.

UNIT VII

GRAPHICAL USER INTERACTION:

SWINGS:

Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- Frame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, menu, Trees, and Tables.

Layout manager– border, grid, flow, card and grid bag.

EVENT HANDLING:

Events, Event sources, Event classes, Event Listeners, Adapter classes, Delegation event model, handling mouse and keyboard events, inner classes.

UNIT VIII

COLLECTIONS FRAMEWORK:

Object class, importance of hashCode() and equals() ,Data Dictionaries- maps, sets, lists, queues, utilities their associated classes, interfaces and hierarchy.

Sorting Collections: Application of Comparable and Comparable Interfaces.

Text Book:

1. Introduction to Java Programming 7/e, Brief version, Y. Daniel Liang, Pearson publications.

Reference Books:

1. Thinking in Java 4E : Bruce Eckel , Pearson.
2. Java: The complete reference, 7/e, Herbert Schildt, TMH.
3. Core Java(TM) Volume 1: Fundamentals, 8/e Horstmann.
4. The Java™ Programming Language Ken Arnold, James Gosling, Pearson.