2/4 B.Tech. SECOND SEMESTER

CS4T3 OBJECT ORIENTED PROGRAMMING THROUGH JAVA Credits: 4

(Common for CSE & IT)

Required

Lecture: 4 periods/week **Internal assessment: 30 marks**

Tutorial: 1 period /week **Semester end examination: 70 marks**

Course context and Overview: This course is aimed at students who wish to learn how to develop applications in Java. This course will also provide an overview of Object Oriented Programming concepts using Java

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Prerequisites: Programming in Java

Objectives:

The main objective of this course is to understand the Object Oriented programming issues in developing more complex software designs. Students will also learn the advantages of Object Oriented programming over the normal and old paradigm structured programming languages. Examples which are demonstrated using java helps the students to understand the concepts and apply the features of Object Oriented programming. The enhancements that are made in the latest certification exams for java are also kept in view. This helps students to keep their skills up to date.

Learning Outcomes:

1. Understand the basic principles and features of Object Oriented Programming in JAVA.
2. Describe the different types of objects, classes, constructors, arrays and their usage in JAVA.
3. Illustrate the package, interface, multi threading and exceptional handling concepts in JAVA with examples.
4. Apply stream I/O and file I/O concepts in JAVA programming.
5. Apply GUI based concepts and event driven features for developing applications.
6. Understand different data dictionaries using collections framework.

UNIT I Java

Basics:

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 ofvariables, operators, expressions, control statements, type conversions rules (type casting), methods and recursion, sample programs.

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:

Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH,importing packages, access controls (public, protected, default, private)

Interfaces: differences between classes and interfaces, defining an interface, implementinginterface, 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

New 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 methods like hashcode( ) and equals( ).Data Dictionaries- maps, sets, lists, queues, utilities their associated classes, interfaces and their hierarchy.

Sorting Collections: application of Comparable and Comparator interfaces.

Learning Resources

Text Books:

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

Reference Books:

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