Java Syllabus

# 3 month course (12 Weeks) – all examples describe by real world scenario.

Java/JavaEE Training Course Overview
Halftone Design Pvt. Ltd.

Course Objective:

- Understanding the concept of Object Oriented Programming Approach.
- Understanding Java Programming Language.
- Understanding Java Runtime Environment and Java Virtual Machine.
- Understanding Core Java.
- Understanding J2EE architecture and specifications.
- Understanding N-Tier Enterprise Application Development using J2EE specifications and frameworks.
- Understanding different open source frameworks.

Week 1 (Core Java)

Part 1 – Java Foundation:

- Object Oriented Programming (OOP) Concept
- Meaning of Abstraction, Polymorphism, Inheritance and Encapsulation
- Introduction of Java Programming Language
- Features of Java Programming Language
- Introduction of Java JDK, JRE, JVM, Class Loader, Compiler, Interpretator, Garbage
- Collector, Environment Variables, Class-Path and import
- Platform Independency
- Introduction to Class, Object, Instance
- First Java Program, Main method, compilation and execution
- Introduction to java Package and Access Modifiers

Part 2 – Java Statements:

- Java Conditional Statements and Loops (IF-ELSE, SWITCH-CASE, WHILE loop, DOWHILE loop, FOR loop)
- Data Types and Variables in Java
- Primitive Data Types
- Expression/Operator in Java
- Java String and Array Objects
- Java I/O streams

Week 2 (Advance Core Java)

Part 1 – Advanced Features:

- Java Generics and type safety
- Auto-boxing /un-boxing
- Java Enumerations
- Introduction to Enhanced ‘For Loop’ (for each loop) in java
- Introduction to enhanced if/else

- Java mutable objects – Introduction to StringBuffer and StringBuilder object
- String Tokenizer
- Comparing and identifying objects
- Class/Type casting in java
- Static methods and variables

Part 2 – Object Collaborations:

- Introduction to Object Composition and Class Inheritance
- 'Has a' and 'Is a' relationship
- Java Class Inheritance
- Java Interface and Abstract Classes
- Inner classes
- Java Object Cloning – Shallow and Deep Copy
- Java Serialization
- Polymorphism – Method Overriding and Overloading

Week 3 (Advance Core Java contd...)

Part 1 – Exception Handling in Java:

- Introduction to Exception and Errors in Java
- Throwable, Error and Exception class
- Exception Hierarchy
- Checked and un-checked exceptions
- Catching exceptions
- Introduction to try, catch, finally, throws and throw

Part 2 – Multi-Threading in Java:

- Introduction to thread and process
- Threaded and non-threaded applications
- Creating Threads- Introduction to Thread Class and Runnable Interface
- Life Cycle of Threads
- Thread methods and Object Methods
- Inter Thread communication and thread priority
- Primitive scheduling and time slicing
- Race condition, Deadlocks, thread leak
- Resource lock and thread synchronization
- Synchronized keyword, Transient object, java.util.concurrent.locks.Lock

Week 4 (Advance Core Java contd...)

Part 1 – SQL and Java JDBC:

- Introduction to SQL (DDL, DML, DCL, DTL)
- Basic SQL operations: Create table, insert data, update data, delete data
- Table joins: self-join, equi-join, inner join, left-outer join and right-outer join
- Introduction to PL/SQL, Stored Procedures, Functions, Views, Triggers, Cursors
- DB performance tuning
- Introduction to JDBC and type 4 JDBC drivers

- Statement, PreparedStatement, CallableStatement
- JDBC ResultSet and MetaData
- Introduction to Transaction and Transaction handling in JDBC

Part 2 – Java Collection Framework:

- Introduction to java Collection framework
- Set and List implementations
- LinkedList, Vector and ArrayList
- Map implementation
- HashTable and HashMap
- Queue and Stack Interface

Part 3 – Java Design Patterns:

- Introduction to OOD and Design Pattern
- Creational Design Patterns: Singleton, Factory, Builder, Prototype, Object Pool
- Behavioral Design Patterns: Command Pattern, Iterator, Observer
- Structural Design Patterns: Adapter, Decorator
- Service oriented Architecture (SOA) design pattern
- Model-View-Controller (MVC) design pattern

Week 5 (J2EE Specifications)

Part 1 – Introduction to J2EE:

- Introduction to J2EE, J2SE
- J2EE architecture and specifications
- Client-Server applications, Web applications, enterprise applications
- 2,3 and n-tier applications

Part 2 – Java Servlet and JSP:

- Introduction to Web Servers and Servlets
- Creating a Servlets and Servlet Methods
- Servlet Life Cycle
- Introduction to Java Server Pages (JSP)
- Creating a JSP page and JSP Life cycle methods
- GET and POST method
- JSP tags and Java Standard Tag Library (JSTL)
- JSP Actions, JSP Expression, Declarations and Scriplets
- JSP implicit objects
- Session tracking

Part 3 – Introduction to EJB:

- Introduction to Application Servers and Enterprise Java Beans (EJB)
- Types of EJB
- Entity Beans – CMP and BMP
- Session Beans – Stateless and Stateful session bean
- Message Driven Beans (MDB)
- Life cycle of Stateful session beans
- Introduction to EJB 3
- Introduction to JMS and JPA

- Transaction Handling in EJB and JPA

Week 6 (J2EE Frameworks)

Part 1 – Hibernate:

- Introduction to OR mapping framework and Hibernate
- Hibernate configuration file
- Hibernate mapping files and mapped persistence classes
- Features and benefits of Hibernate
- Introduction to Configuration, SessionFactory, Session, Transaction, Query, Criteria
- Transaction handling in Hibernate
- Table relationships in Hibernate
- Hibernate Exceptions
- Introduction to Transient, Persistent and Detached object in Hibernate
- Hibernate Template

Part 2 – WebServices:

- Introduction to SOA and WebServices
- SOAP based WebServices and RestFull WebServices
- Publishing and consuming WebServices

Week 7 + Week 8 (J2EE Frameworks – Spring Framework)

Part 1 – Spring Framework

- Introduction to Spring Framework
- Dependency Injection (DI) and Inversion of Control (IOC)
- Feature of Spring Framework
- Spring Components/Layers
- Bean Factory, Spring Context, Spring AOP, Spring DAO, Spring ORM, Spring Web
- Module, Spring MVC
- Spring Configuration File
- Spring Bean Life Cycle
- Spring Bean Factory Interface
- Spring Application Context
- Types of Dependency Injection
- Spring Bean Wiring and Auto Wiring
- Spring Bean Scopes

Part 2 – Spring ORM

- Introduction to Spring ORM
- Spring Integration with Hibernate Framework
- Configuring Hibernate Data Source in Hibernate configuration file
- Spring-Hibernate SessionFactory object
- Getting Hibernate Session object from Spring
- HibernateTemplate
- Spring programmatic Transaction Handling
- Declarative Transaction Handling with AOP
- Spring Propagation types

Part 3 – Spring Web Module

- Introduction to Spring Web Module
- Integrating Spring with Struts
- Various ways to integrate Struts in Spring
- Spring-Struts plug-in in Struts Configuration fie
- Overriding Struts Request Processor
- Delegating Struts Action Management to Spring

Week 9 + Week 10 (J2EE Frameworks - Spring Framework Contd…)

Part 1 – Spring MVC

- Introduction to Spring MVC
- Spring Front Controller – Dispatcher Servlet
- Spring View Resolver, Handler Mapping, and ModelAndView components
- Spring MVC configuration

Part 2 – Spring framework with Annotations

- Introduction to Spring Annotations
- Spring Stereotype Annotations
- Spring MVC Annotations
- Spring AOP Annotations and others
- Spring Transaction Handling using Annotations
- Enabling annotations in Spring
- Spring Auto Wiring and Bean Wiring using Annotations

Part 3 – J2EE application packaging and deployment

- Introduction to the term clean, build and deploy
- Introduction to .jar, .war, .ear archive
- Deploying application using IDEs
- Deploying application using webserver/application server admin console
- Introduction to ANT and MAVEN tools
- Introduction to log4j
- Introduction to source control and repository

Week 11 + Week 12 (Final Project)

Develop the final project using above describe technology stack.