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# Java Core and Advanced

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# Java Core and Advanced Certification Training

## Course Overview:

This course of study builds on the skills gained by students in Java Fundamentals or Java Foundations to help advance Java programming skills. Students will design object-oriented applications with Java and will create Java programs using hands-on, engaging activities. Java course requires no previous coding experience and will provide you with foundational knowledge of Core Java 9, including the scope of variables, operators, arrays, loops, methods and constructors, while giving you hands-on experience in JDBC and JUnit Framework. You will then move on to mastering advanced Java topics such as JDBC, JSP's Servlets, web services and Hibernate and Spring frameworks.

## Course Outline:

## Core Java

### 1. Getting Started with Java SE

- What is Java?
- Installing Java
- The jdk Directory Structure
- Sdk structures
- OOPS Concept
- Java Language
- Java Virtual Machine
- World Wide Web and Java
- Java Platforms

### 2. First Java Programs

- Writing your first Java program "Hello, World", your first small step towards learning Java
- Program Structure
- Output in Java

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- Variables and Expressions

3. **Data types and Variables**
    - Primitive Data types
    - Variable Names
    - Numeric Literals
    - Character Literals
    - String
    - String Literals
    - Arrays

4. **Introduction to Objects**

    - Object Models
    - Classes and Objects
    - Abstract methods and Classes
    - Input in Java
    - Input Wrapper Class
    - Packages

5. **Data Types and Operators**

    - Strong Typing
    - Integer Data Types
    - Floating Point
    - Conversions Between Types
    - Arithmetic Operators
    - Doing Math in Java
    - Precedence
    - Errors in Integer Arithmetic

6. **Control Flow**

7. **Booleans and Enumerations**

8. **Loops and Program Flow**

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## 9. Object-Oriented Programming

- Classes and Objects
- Fields and Methods
- Encapsulation
- Access Control
- Inheritance
- Polymorphism
- Interface
- Best Practices

## 10. Methods

- Methods
- Calling Methods
- Defining Methods
- Method Parameters
- Method Overriding
- Method Overloading

## 11. Characters and Strings

- Char Data Type
- Character Codes
- ASCII and Unicode
- String Class
- String Input and Output
- String Methods

## 12. Modular Programming

- Monolithic Programs
- Static Variables and Methods
- Functional Modularity
- Object Modularity
- Top-Down and Bottom-Up Development
- Pass-By-Value and Pass-By-Reference

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- Nested Classes

**13. Exception Handling and More Flow Control**

- Exceptions Overview
- Exceptions
- Declaring Exceptions
- Defining and Throwing Exceptions
- Errors and Runtime Exceptions
- Catching Exceptions
- The finally Block
- Exception Methods
- I/O Exceptions vs Runtime Exceptions

**14. Input/Output Streams**

- Overview of Streams
- Bytes VS Characters
- Converting Byte Streams to Character Streams
- File Object
- Binary Input and Output
- Print Writer Class
- Reading and Writing Objects
- Basic and Filtered Streams

**15. Core Collection Classes**

- The Collections Framework
- The Set Interface
- Set Implementation Classes
- The List Interface
- List Implementation Classes
- The Queue Interface
- Queue Implementation Classes
- Implementing a Stack
- The Map Interface
- Map Implementation Classes

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### 16. Collection Sorting and Tuning

- New Features in JSE 6
- Changing in I/O(JSE 6)
- Using Java 6.0 Features with Collections
- Sorting with Comparable
- Sorting with Comparator
- Sorting Lists and Arrays
- Collections Utility Methods
- Tuning Array List
- Navigable Map and Navigable Set
- Tuning Hash Map and Hash Set

### 17. Inner Classes

- Inner Classes
- Member Classes
- Local Classes
- Anonymous Classes
- Instance Initializes
- Static Nested Classes

### 18. Introduction to Threads

- Overview of thread
- Life Cycle of thread
- Creating Threads
- Multithreading
- Deadlock
- Inter-Thread Communication
- Thread States
- Runnable Threads
- Coordinating Threads
- Interrupting Threads
- Runnable Interface

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- Thread Groups

## 19. Packages

- Packages
- The import Statement
- Static Imports
- CLASSPATH and Import
- Defining Packages
- Package Scope

## 20. Advanced Java Features

- Reusable Software Components
- Abstraction
- Inheritance
- Inheritance Hierarchies
- Polymorphism
- Abstract Classes
- Interfaces
- Collections
- Iterators
- Auto-Boxing

## 21. Introduction to JDBC

- Features of JDBC 3.0
- Features of JDBC 4.0
- New Features in JDBC 4.0
- Difference between JDBC 3.0 and JDBC 4.0
- The JDBC Connectivity Model
- Database Programming
- Connecting to the Database
- Creating a SQL Query
- Getting the Results
- Updating Database Data

## 22. JDBC SQL Programming

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- Error Checking and the SQLException Class
- The SQLWarning Class
- JDBC Driver Types
- Result Set Meta Data
- Using a Prepared Statement
- Parameterized Statements
- Stored Procedures
- Transaction Management

# Advanced Java (J2EE)

1. Advance JDBC Programming
2. Overview of Database Driver Architecture
3. Connection Pooling
4. Introduction to J2EE
5. J2EE Overview
6. Why J2EE?
7. J2EE Architecture
8. J2EE APIs
9. J2EE Containers
10. Java Server Technologies

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## JDBC

- Introduction
- JDBC Architecture
- Types of Drivers
- Statement
- Result Set
    - Read Only Result Set
    - Updatable Result Set
    - Forward Only Result Set
    - Scrollable Result Set
    - Prepared Statement

# Servlets 3.0

- Need of Server side Programming
- Introduction to Servlets
- Servlet Life Cycle
- javax.servlet package
- ServletConfig, ServletContext, ServletResponse
- Supplying initialization parameters to Servlets
- Performing database operations in Servlets
- Include and forward mechanisms
- Applying filters to Servlets
- javax.servlet.http Package
- HttpServlet Life Cycle
- Http request methods GET vs POST
- HttpServletRequest, HttpServletResponse
- Dealing with Http headers & error codes
- Session Tracking, purpose
- Hidden form fields, Cookies
- Http Session, URL rewriting
- Event listeners
- Web application security

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# JSP 2.2

- Disadvantages of Servlets
- Introduction to JSP
- JSP Life Cycle
- Creating dynamic Web content with JSP
- Scripting elements
- Scriplet
- Declaration
- Expression
- XML syntax for JSP elements

- JSP directives page, include and taglib
- JSP implicit objects
- JSP scopes
- Include and forward mechanism
- Using a Java bean in a jsp
- JSP Model 1 architecture
- JSP Model 2 (MVC) architecture
- Custom Tag Development
- Classic Tags, Simple Tags
- Error Handling in a jsp
- JSTL
- Expression Language
- Processing XML in a jsp

# Web Services

- SOAP 1.1 (Simple Object Access Protocol)
- UDDI 2.0 (The Universel Description, Discovery and Integration )
- WSDL 1.1(Web Services Description Language)
- JAX-RPC 1.1(Java API for XML Remote Procedure Call)
- SAAJ 1.2 (SOAP with Attachments API for Java)
- JAXR (Java API for XML Registration)
- JAXB (Java Architecture for XML Binding)
- JAXWS (Java API for XML…….Webservices)

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# Spring

**1: Spring Basics**

- What is Spring Framework
- Inversion of Control
- Dependency Injection
- Bean Factory
- Developing First Spring Application

**2: Spring Container**

- Built-in Bean Factories
- Application Context
- Wiring Beans
- Bean Lifecycle in Container
- Spring Events

**3: Spring AOP**

- Introduction to AOP
- Role of AOP in Spring
- AOP Advice
- AOP Pointcuts
- Spring AOP Introductions
- ProxyFactoryBean

**4: Spring Data Access**

- JDBC Abstraction Layer
- Data Access Exceptions
- DAO Support

**5: Spring O-R /mapping**

- What is O-R Mapping
- O-R Mapping support in Spring
- Hibernate Support / Mapping

**6: Spring Transaction Management**

- Transaction Abstraction in Spring
- Transaction Strategies
- Programmatic Transaction
- Declarative Transaction

**7: Spring Remoting and Enterprise Services**

- Introduction to Spring Remoting
- Java RMI in Spring
- Accessing JNDI

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- Invoking EJB from Spring
- Web Service in Spring using JAX-RPC Support
- Messaging Support in Spring using JMS
- Sending Mail with Spring Mail
- Scheduling using Timer Support

### 8: Spring Web MVC Framework

- Web MVC Architecture
- Role of DispatcherServlet
- Controller
- Handler
- View Resolving
- Data Binding
- File Upload Support

### 9: Securing Spring Application

- Acegi Security System for Spring
- Authentication
- Access Control
- Web Application Security
- Method Invocation Security

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## Hybernate

### 1: Introduction to Hibernate

- Drawbacks of direct JDBC
- Plain Old Java Object (POJO)
- What is O-R Mapping
- Simple Database Application

### 2: Hibernate Configuration

- Required JAR Files
- Hibernate configuration File
- Hibernate properties File

- Hibernate XML File
- SQL Dialects

**3: Hibernate Concepts**

- Id and Primary Key
- Id Generation Methods
- SessionFactory
- Session
- Transaction
- Developing CRUD Application

**4: Hibernate O-R Mapping**

- Mapping Declarations
- Modeling Composition with Relationship
- Modeling Composition with Components
- One-to-One Association
- One-to-Many Association
- Many-to-Many Association
- Uni and Bidirectional Associations
- Hibernate Value Types
- Custom Types

**5: Manipulating and Querying**

- Persistent Objects
- Object Loading
- Executing Queries
- Iterating Results
- Scalar Results
- Bind Parameters Pagination

**6: Hibernate Query Language**

- Select clause
- From clause
- Where clause
- Aggregate functions

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- Expressions
- Sorting
- Grouping
- Sub queries

### 7: Criteria Queries

- Creating Criteria
- Narrowing the Result
- Ordering the Result

### 8: Native SQL

- Using SQL Query
- Named SQL Query
- Using Stored Procedure for Querying
- Creating Custom SQL for CRUD

### 9: Transaction and Concurrency

- Session and Transaction Scopes
- Database Transaction Demarcation
- Optimistic Concurrency Control
- Pessimistic Concurrency Control
- Connection Release Modes

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## Prerequisites:

- Fundamental knowledge of object-oriented concepts, terminology, and syntax, and the steps required to create basic Java programs.

## Who Can attend:

- Software Developers, Architects and Web Designers
- Students and professionals looking to be Java Developers
- Students who wish to extend their programming experience in Java and develop more complex Java applications
- This course is a suitable foundational class for computer science majors and non-majors alike, and when taught in sequence with Java Fundamentals or Java Foundations

- **Number of Hours: 70hrs**
- **Certification: OCPJP 8 or 1Z0-809**
- **Key Features:**

- One to One Training
- Online Training
- Fastrack & Normal Track
- Resume Modification
- Mock Interviews
- Video Tutorials
- Materials
- Real Time Projects
- Virtual Live Experience
- Preparing for Certification

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