

KOENIG SOLUTIONS · COURSE OUTLINE

Java with Advanced web technologies including React and Redux

Learn to build Java applications and full-stack web solutions using Spring Boot, React and Redux, from OOP to state management.

6 Days

8 HOURS A DAY

31

MODULES

131

TOPICS

COURSE OVERVIEW

This course covers core Java programming concepts including classes, objects, inheritance, interfaces, exception handling, collections, streams, multithreading and JDBC, along with JVM fundamentals, JUnit testing with Mockito and build automation with Maven. It then moves into server-side web technologies, covering client-server architecture, Servlets, Filters, Listeners and WebSockets, before introducing database technologies such as PostgreSQL, SQL Server and Apache Cassandra. The course continues with Spring Boot, Spring Data JPA and RESTful API development, and concludes with front-end technologies including HTML, CSS, JavaScript, TypeScript, React, custom React hooks, React Query and Redux for state management.

WHO THIS COURSE IS FOR

Java Developers

Web Developers

Full Stack Developers

Front-End Developers

Backend Developers

Software Engineers

LEARNING OBJECTIVES

- Apply object-oriented concepts such as inheritance and polymorphism
- Implement exception handling using try, catch and custom exceptions
- Apply Java collections, generics and the Stream API
- Implement multithreading using threads and concurrency utilities
- Develop database access layers using JDBC and Spring Data JPA
- Build RESTful APIs using Spring Boot
- Develop front-end interfaces using HTML, CSS and JavaScript
- Implement state management in React applications using Redux

31 Modules, 131 Topics

01

Classes and Objects

TOPICS

- Define a class
- Access modifiers, namely public, protected, default and private
- Objects and object references
- Constructors, new operator
- 'this' reference
- static class members

02

Object Oriented Programming Techniques

TOPICS

- Encapsulation, Abstraction
- Java's inheritance model and its language syntax, Super class reference variable, usage of the keyword super
- Multilevel hierarchy
- Method overriding
- Dynamic method dispatch, or runtime polymorphism

03

Object Class & Packages in Java

TOPICS

- Object class and its methods, Garbage collection
- Describe finalization, Organize classes into Packages
- Create and import packages
- Built in packages in Java

04

Abstract Classes & Interfaces

TOPICS

- Abstract classes, Interfaces
- Marker Interfaces
- Runtime polymorphism with interfaces, Nested classes and inner classes

05

Exception Handling

TOPICS

- Exception handling mechanism of Java
- Use of the keywords that comprise Java's exception handling mechanism
- Try with multiple catch
- Nested try
- Multiple catch involving Exception superclass and subclass
- Checked and unchecked exceptions
- Creating our own Exception classes
- Rules governing checked exception

06

I/O Streams

TOPICS

- Define input and output streams in Java
- Define Byte streams and Character streams
- Define the predefined stream objects defined in the System class, namely in, out, and err
- Reading and writing from a file
- Copying images from one file to another file
- Object Serialization, Serializing inbuilt and user defined objects

07

Collections & Generics

TOPICS

- Describe the need for wrapper classes
- Define wrapper classes
- Auto boxing/unboxing
- Describe the context of using the Cloneable interface, Hierarchy of Collection Framework
- Methods of Collection interface
- Interfaces (Set, List, SortedSet, Queue etc.) and their methods
- Classes (ArrayList, Vector, LinkedList, PriorityQueue, HashSet, LinkedHashSet, TreeSet etc.)
- Comparison between those classes
- Facilitate the processing of collections through the Enumeration & Iterator, Generics, Bounded Types and Unbounded Types, Object class equals and hashCode method in context of Collections
- Comparable and Comparator Interface

08

Functional Interfaces and Stream API, Date and Time API

TOPICS

- FunctionalInterface Annotation
- java.util.function package
- Supplier, Consumer, Predicate, Function
- Stream API
- Sequential Streams and Parallel Streams with their implementations
- Date and Time API in Java8

09

Multithreading

TOPICS

- Define multithreading
- Differentiate between multitasking and multithreading
- Describe Java's multithreading mechanism in the form of the Thread class and the Runnable interface
- Describe some key methods of the Thread class
- Describe Thread priorities
- Describe race conditions that are likely to occur between threads that are not synchronized
- Define thread synchronization through the use of the synchronized keyword
- Facilitate inter-thread communication with the help of wait(), notify(), and notifyAll() methods
- Java Concurrency Models
- Java Concurrency Vs Parallelism
- Thread Pools and Concurrency Utilities

10

JDBC

TOPICS

JDBC Architecture & JDBC Drivers · CRUD operations · Establish a Connection · Executing a Query · Processing Results · ResultSet Interface

11

JVM

TOPICS

- JVM, It's Limitations, Weaknesses and Workarounds

JUnit Tests With Mockito

TOPICS

Introduction to Junit5 · Test Cases & It's Annotations · Assert class · Mockito Framework Implementation · And It's Advantages

12

Build Tool Maven

TOPICS

Introduction to Maven · Why Use Maven? · Maven Terminology · Maven Lifecycle · Maven Plugins · **Demo:** Building a Project with Maven · Benefits of Maven

13

Client Side and Server Side Architecture

TOPICS

2 Tier Architecture · 3 Tier Architecture · Layered Architecture

Tomcat Servlet Engine

TOPICS

- Servlets- Overview
- Servlets- Environment Setup
- Servlets- Life cycle, ServletConfig & ServletContext

14

Filters & Listeners

TOPICS

Filters · Life Cycle of Filters · Filter Pipeline · Listeners and Types of Listeners

15

Web Socket

TOPICS

ServerEndPoint · ClientEndPoint · OnOpen · OnClose · OnError · OnMessage

16

PostgreSql

TOPICS

DML · DDL · DQL · Conditional Clauses · Group By · Having · JOINS · SubQuery

17

Introduction to SQL Server, Apache Cassandra

TOPICS

- Introduction to Unstructured Database Cassandra

18

Spring Boot

TOPICS

- Introduction to Spring Boot, Benefits and Implementation

19

Spring Data JPA

TOPICS

JpaRepository · Entity · Custom Methods
in Repository

20

RestFul API Integration

TOPICS

Using SpringBoot to create RestFul API

21

HTML

TOPICS

- HTML Basics, LIST, LINKS, TABLES, Image, FORMS

22

CSS

TOPICS

- Introduction to CSS, Types of CSS, Selectors, Border, Text, Color etc

23

Java Script

TOPICS

- JS Variables, Operators, Conditional Constructs, let, const, var, Arrow Functions, Client Side Validation

24

Type Script

TOPICS

- Introduction, Transpiler, Var Hoisting, Data Types, Types of Functions, Arrays & Tuples
- Object Oriented Concepts in TS

25

React

TOPICS

- React.js, Core Principle (Components, State Management, Hooks, Life Cycle Methods)

26

React Styling

TOPICS

- CSS Styling
- Dynamic Styling and Conditional Styling
- Dynamic List Content
- Managing List with Keys in React, Use Keys and Refs in React

Custom React Hooks

TOPICS

Building Custom React Hooks · Managing States and Returning State Values · Exposing Nested Functions from Custom Hooks

27

Sending Http Request & React Query / Transtack Query

TOPICS

Sending Http Request (GET, POST, PUT, DELETE) · Handling Http request in React app with Ease · Installing and using Transtack Query

28

Redux

TOPICS

- How Redux Works?
- Redux vs React Context
- Redux Store
- Redux for State Management
- Store, Reducers, Containers, Actions, Providers
- Redux Thunk
- Finalizing the fetching Logic

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

Learn the Way That Suits You

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Live Online Classes (ILO)

Fly-Me-A-Trainer (FMAT)

Flexi (Self-Paced)

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