KOENIG SOLUTIONS · COURSE OUTLINE

Advanced Full Stack Web Development with Microservices, MFE and Spring Framework

Learn to build full stack applications with Java, Spring, modern JavaScript frameworks, microservices and Kubernetes deployment.

5
MODULES

50
TOPICS

COURSE OVERVIEW

This course covers advanced Java core concepts including Java 8+ features, the Java memory model and exception handling, followed by backend development with Spring, including Spring Core, Spring Data JPA, Spring Security and JWT, with optional integration through Kafka and WebClient. It then moves to frontend development with Angular or React, TypeScript, component-based architecture, state management, routing, REST API consumption and styling with CSS3 and preprocessors. The course continues with full stack integration covering API connections, authentication flow, Dockerizing and Kubernetes deployment, and API testing with Postman. It concludes with microservices architecture, covering service discovery, API gateways, inter-service communication, distributed systems patterns and Kubernetes deployment of microservices.

WHO THIS COURSE IS FOR

- **Backend Developers**
- **Frontend Developers**
- **Full Stack Developers**
- **Java Developers**
- **Microservices Architects**

LEARNING OBJECTIVES

- Apply Java 8+ and Java 21 features such as Streams and Records
- Explain the Java memory model and garbage collection behaviour
- Implement exception handling best practices in Java applications
- Build backend services with Spring Core, JPA and Spring Security
- Develop frontend applications with Angular or React and TypeScript
- Implement state management and routing in component-based architectures
- Configure full stack integration with authentication and CORS handling
- Deploy Dockerized microservices to Kubernetes with Spring Cloud

COURSE SYLLABUS

5 Modules, 50 Topics

01

Advanced Java Core Concepts

DEEP DIVE INTO JAVA 8+ FEATURES

- **Java 8 features (example:** Lambda, Stream API, Functional Interface)
- **Java 21 features (example:** Record, Virtual Thread, Pattern Matching etc.)
- Java Memory Model (Garbage Collection, Heap, Stack)
- Best Practices for Exception Handling
- JVM Optimization Techniques (Good to Have)

02

Backend Development with Spring Framework

SPRING CORE

- Spring AOP and Transaction Management

SPRING BOOT PERSISTENCE LAYER

- Spring Data JPA (CRUD Operations, JPQL, Native Queries)

SPRING SECURITY

- Spring Security (Authentication, Authorization)
- JWT Implementation for Token-based Security

INTEGRATION (GOOD TO HAVE)

- **Connecting to external APIs using Asynchronously (ex:** Web Client)
- Messaging with Kafka

MONITORING

- Integrating Actuator and Micrometer for application monitoring

03

Frontend Development with Modern JavaScript Frameworks

INTRODUCTION TO FRONTEND FRAMEWORKS

- HTML5 Advance topics (Local storage, Responsive images, Web workers, Drag and Drop API, Web sockets, Microdata etc.)
- Knowledge of Advance JS and ES6+ features in depth
- Knowledge of Typescript in depth
- Knowledge of Angular or React in depth
- Basic knowledge of Shadow DOM and Virtual DOM
- Design patterns (Singleton, Factory pattern, Module, Prototype etc.) (Good to Have)
- Micro frontend architecture (Good to Have)

COMPONENT-BASED ARCHITECTURE

- Creating Reusable Components
- Creating Custom Directives
- State Management (Redux or Saga or RxJS)
- Routing and Navigation
- Handling REST API calls (Axios or Angular HttpClient)
- Real-time Updates with WebSockets

STYLING

- Deep drive knowledge in CSS3 (Grid, Flex etc.)
- CSS Preprocessors (SASS/LESS)
- Material Design or Bootstrap

BUILD TOOLS

- Vite or Webpack

UNIT TESTING

- Jest or Mocha

04

Full Stack Integration

CONNECTING FRONTEND AND BACKEND

- API Integration (Frontend consuming Backend APIs)
- Authentication and Authorization Flow
- Handling CORS Issues

DEPLOYMENT AND TOOLS

- Dockerizing Full Stack Applications
- Kubernetes deployment for Java applications

PERFORMANCE OPTIMIZATION (GOOD TO HAVE)

- Caching
- Lazy Loading and Pagination

TESTING

- API Testing with Postman
- How to Run Postman Scripts from Newman CLI Commands (Good to Have)

05

Microservices Architecture

INTRODUCTION TO MICROSERVICES

Monolith vs Microservices · Principles of Microservices Architecture

BUILDING MICROSERVICES (HIGH LEVEL)

Spring Cloud (Netflix OSS) · Service Discovery with Eureka · API Gateway with Zuul/Spring Gateway · Load Balancing with Ribbon

INTER-SERVICE COMMUNICATION

REST, gRPC

DISTRIBUTED SYSTEMS

Circuit Breakers with Resilience4j/Hystrix · Distributed Logging and Monitoring · Tracing with Zipkin or Jaeger

Deploying Microservices with Kubernetes

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.

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Learn the Way That Suits You

Classroom Training | Live Online Classes (ILO) | Fly-Me-A-Trainer (FMAT) | Flexi (Self-Paced) | 1-on-1 Training

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