Java Developer Advanced Training

Course Duration: 64 Hours **Course Code : JDAT-401**

1. Course Overview

The **Java Developer Advanced Training** program is designed for professionals who already have foundational Java knowledge and want to **master advanced concepts, frameworks, and tools** to become industry-ready full-stack Java developers. This course covers **Java 8+ features, design patterns, multithreading, JVM internals, Spring Boot, Microservices, REST APIs, cloud deployment, and DevOps integration**. By the end, learners will be able to build, test, and deploy scalable enterprise-grade applications.

2. What You'll Learn?

- Advanced **Java SE features** (Streams, Lambda, Functional Programming).
- **Collections Framework** deep dive and performance tuning.
- **Multithreading & Concurrency** best practices.
- **JVM architecture** and garbage collection optimization.
- **Design Patterns** for enterprise applications.
- Building enterprise applications with **Spring Boot**.
- Developing **RESTful APIs & Microservices**.
- Database handling with **JPA, Hibernate, and Spring Data JPA**.
- Secure applications using **Spring Security & JWT**.

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- Cloud deployment with **Docker, Kubernetes, and AWS/Azure**.
- Integrating **CI/CD pipelines** for Java projects.
- Advanced **testing strategies** with JUnit, Mockito, and Testcontainers.

3. Target Audience

- Intermediate Java developers looking to become **advanced professionals**.
- Software engineers preparing for **enterprise Java roles**.
- Backend developers aiming to transition to **full-stack Java development**.
- Students/professionals seeking **career growth in Java and cloud-native apps**.

4. Pre-Requisites

- Strong understanding of **Core Java (OOP, Collections, Exception Handling, I/O, JDBC)**.
- Familiarity with **basic SQL and databases**.
- Some exposure to **Spring framework** (helpful but not mandatory).

5. Course Content

Module 1: Advanced Java Language Features

- Java 8+ features (Streams, Lambdas, Optional, Functional Interfaces)
- Generics in-depth
- Reflection API
- Java Modules (Java 9 and above)

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Module 2: Collections and Data Structures in Java

- Collections API deep dive (List, Set, Map, Queue)
- Concurrent collections
- Performance tuning and memory optimization

Module 3: Multithreading and Concurrency

- Thread lifecycle and synchronization
- Executor framework
- Fork/Join framework
- Parallel streams
- Handling concurrency issues

Module 4: JVM Internals and Performance

- JVM architecture and class loading
- Garbage collection strategies
- Memory management
- Profiling and tuning Java applications

Module 5: Design Patterns and Best Practices

- Creational, Structural, and Behavioral patterns
- Singleton, Factory, Builder, Observer, Strategy, etc.
- Best practices for enterprise Java coding

Module 6: Spring Boot for Enterprise Applications

- Dependency Injection and Spring Core
- RESTful web services with Spring Boot
- Spring Data JPA and Hibernate
- Spring Security and JWT authentication
- Spring Boot Actuator and Monitoring

Module 7: Microservices Development

- Microservices architecture principles
- Building microservices with Spring Boot
- Service discovery with Eureka
- API Gateway with Spring Cloud Gateway
- Inter-service communication (Feign, RestTemplate, gRPC)

Module 8: Database Integration

- Relational databases with JPA/Hibernate
- Transaction management
- NoSQL databases (MongoDB, Redis, Cassandra)
- Query optimization

Module 9: Testing and Quality Assurance

- Unit testing with JUnit 5 & Mockito
- Integration testing with Spring Boot Test
- Testcontainers for database testing
- CI/CD test automation

Module 10: DevOps and Cloud Deployment

- Containerization with Docker
- Orchestrating with Kubernetes
- Deploying Java applications on **AWS, Azure, GCP**
- CI/CD pipelines with Jenkins, GitHub Actions, or GitLab

Module 11: Advanced Topics

- Event-driven architecture with Kafka/RabbitMQ
- Reactive programming with Spring WebFlux
- REST vs GraphQL APIs

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- Securing APIs with OAuth2 and Keycloak

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