

# Alphanove Academy

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## Course Contents

**Introduction to Java and Spring Boot:** This module will introduce the basics of Java programming language and Spring Boot framework. It will cover the fundamental concepts of object-oriented programming, data types, control structures, and how to create a simple Spring Boot application.

**Setting up a development environment:** This module will guide participants through setting up a development environment for Java and Spring Boot, including installing JDK, IDE, and configuring Spring Boot project.

**Spring Boot basics:** This module will cover the core concepts of Spring Boot, including annotations, controllers, endpoints, and dependency injection. Participants will learn how to create a basic Spring Boot application, run it, and test it.

**Building RESTful APIs:** This module will cover the principles of RESTful web services and how to build them with Spring Boot. Participants will learn how to create RESTful endpoints that can handle HTTP requests, retrieve data from a database, and return JSON responses.

**Introduction to databases and JPA:** This module will cover the basics of databases and how to interact with them using Spring Boot and JPA. Participants will learn how to configure a database connection, create entities, and perform CRUD operations.

**Handling exceptions and errors:** This module will cover how to handle exceptions and errors that can occur in a Spring Boot application. Participants will learn how to create custom error messages, handle HTTP error codes, and log errors.

**Testing and debugging Spring Boot applications:** This module will cover the basics of testing and debugging Spring Boot applications. Participants will learn how to write unit tests for Spring Boot components, use the debugger to step through code, and use logging to troubleshoot issues.

**Deploying Spring Boot applications:** This module will cover the various ways to deploy a Spring Boot application, including deploying to a server or container, creating a self-contained executable JAR, and deploying to a cloud platform.

**Spring Boot configuration:** This module will cover advanced Spring Boot configuration techniques, including configuring properties, profiles, and externalizing configuration. Participants will learn how to use Spring Boot Actuator to monitor and manage their applications.

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**Advanced RESTful API design:** This module will cover advanced RESTful API design principles, including versioning, pagination, and hypermedia. Participants will learn how to use Spring HATEOAS to create self-describing hypermedia-driven RESTful APIs.

## Spring Webflux

**Securing Spring Boot applications:** This module will cover how to secure Spring Boot applications, including authentication and authorization. Participants will learn how to use Spring Security to implement security features such as user authentication and role-based access control.

**Caching in Spring Boot:** This module will cover how to use caching in Spring Boot applications to improve performance. Participants will learn how to configure caching, use caching annotations, and use Redis as a caching solution.

**Microservices with Spring Boot:** This module will introduce the concept of microservices and show how to build microservices with Spring Boot. Participants will learn how to use Spring Cloud to implement microservices patterns such as service discovery, configuration management, and circuit breakers.

**Messaging with Spring Boot:** This module will cover how to use messaging in Spring Boot applications, including messaging patterns such as publish/subscribe and request/reply. Participants will learn how to use Spring Integration to implement messaging features.

**Performance tuning and monitoring:** This module will cover performance tuning and monitoring techniques for Spring Boot applications. Participants will learn how to use profiling tools, identify performance bottlenecks, and use metrics to monitor application performance.

**Containerization with Docker:** This module will cover how to containerize Spring Boot applications using Docker. Participants will learn how to create Docker images, manage containers, and deploy applications using Docker.

**Container orchestration with Kubernetes:** This module will cover how to orchestrate Spring Boot applications using Kubernetes. Participants will learn how to deploy applications to a Kubernetes cluster, scale applications, and manage application updates.

**Advanced microservices architecture with Spring Cloud:** This module covers advanced microservices architecture concepts using Spring Cloud. Participants will learn how to build and manage microservices using tools such as Spring Cloud Config, Spring Cloud Netflix, and Spring Cloud Gateway.

**Developing event-driven microservices with Spring Cloud Stream:** This module covers how to build event-driven microservices using Spring Cloud Stream. Participants will learn how to

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implement event-driven architectures, use messaging patterns such as publish/subscribe, and integrate with messaging systems such as Apache Kafka and RabbitMQ.

**Implementing distributed tracing and logging:** This module covers how to implement distributed tracing and logging using tools such as Spring Cloud Sleuth/ELK and Zipkin. Participants will learn how to trace requests across microservices, and how to log and analyze application logs.

**Building data pipelines with Apache Kafka:** This module covers how to build data pipelines using Apache Kafka. Participants will learn how to use Kafka for streaming data processing, and how to build data pipelines using Kafka Connect and Kafka Streams.

**Advanced testing strategies** (e.g., integration testing): This module covers advanced testing strategies such as integration testing. Participants will learn how to design and implement tests for microservices, and how to ensure that microservices are working correctly within the larger system.

**Continuous integration and continuous deployment (CI/CD) pipelines:** This module covers how to build CI/CD pipelines for deploying microservices using tools such as Jenkins and GitLab. Participants will learn how to automate the deployment process and ensure that changes are deployed consistently and reliably.

**Design patterns for building scalable, resilient applications:** This module covers design patterns for building scalable, resilient applications. Participants will learn how to use patterns such as circuit breaker, retry, and bulkhead to build fault-tolerant applications.