**🧠 Introduction to Spring & Spring Boot**

**Duration: 1 Week**  
**Topics Covered:** **IOC, Beans, Dependency Injection, Maven, Annotations, Autoconfigurations, Spring Initializer**

**✅ What You’ll Learn:**

* Spring Framework Core Features like Spring IOC Container, Java-based configuration, Annotation-based configuration, Dependency Injection, and more
* Spring Boot Fundamentals and Features – Dive into Spring Boot Internals, Autoconfiguration, Spring Initializer, and Starter Projects
* Internal Flow of a Spring Boot Application
* Maven Build Tools and Lifecycle goals

**🚀 Spring Boot MVC and RESTful APIs**

**Duration: 1 Week**  
**Topics Covered:** **Spring MVC, Web Server, REST APIs, Lombok, Model Mappers, CRUD operations, Bean Validation, Exception Handling**

**✅ What You’ll Learn:**

* Spring MVC Concepts – Learn how to create APIs using MVC. Turning your API dreams into reality, one controller at a time!
* Lombok – Simplify your Java code with Lombok
* Setting up an In-Database Database with H2 DB
* Bean Validation – Ensure your data is always squeaky clean before it even reaches the Service layer
* Exception Handling in Spring Boot Applications

**🛠️ Spring Boot Data JPA and Database Integration**

**Duration: 1 Week**  
**Topics Covered:** **MySQL, DBever, JPA, Hibernate, Tools, M:N, 1:N, Database Constraints**

**✅ What You’ll Learn:**

* Install MySQL database server and DBever analytics tool
* Spring Data JPA Fundamentals like data drivers, JDBC, ORM, Spring Data JPA Repositories, etc.
* Configure Hibernate ORM with MySQL Database
* Build custom queries effectively using Spring Data JPA Query Methods
* JPQL and Named Query – Master JPQL and Named Queries
* One to One, One to Many, Many to One and Many to Many Mappings with real-world examples

**🧩 Production Ready Spring Boot Features**

**Duration: 1 Week**  
**Topics Covered:** **Metrics, Health Checks, Swagger Documentation, Open API, Spring Dev Tools, Logging, REST Template, Third-party APIs**

**✅ What You’ll Learn:**

* Spring Boot Actuator – Monitor your application's health with Spring Boot Actuator
* Spring Documentation with Swagger and Open API
* Spring Dev Tools – Supercharge your development with Spring Dev Tools
* REST Template and Third-party APIs – Integrate third-party APIs with ease. Bring the power of the internet to your app!

**🔐 Authentication & Authorization with Spring Security**

**Duration: 2 Weeks**  
**Topics Covered:** **Authentication, Authorization, Google OAuth, Request Filters, JWT, Password Encoding, Session Management**

**✅ What You’ll Learn:**

* Create a secure Login and user registration system
* Add request filters to secure REST endpoints
* Secure against CSRF (Cross-Site Request Forgery) and XSS (Cross-Site Scripting) attacks
* Third-party registration system with Google OAuth and JWT authentication
* Implement role-based access control with Spring Boot Authorization and SQL Database
* Password Security with Encoding – Secure passwords with encoding
* Session Management – Manage user sessions effectively

**🧪 Spring Boot Junit Testing**

**Duration: 1 Week**  
**Topics Covered:** **JUnit, Assert Methods, Unit Testing, Mockito**

**✅ What You’ll Learn:**

* Get started with testing and JUnit. Test early, test often, and test correctly
* Dive deep into JUnit annotations and assert methods
* Master Mockito for unit testing

**🚀 Spring Boot Deployment with CI/CD**

**Duration: 1 Week**  
**Topics Covered:** **AWS, Elastic Beanstalk, Buildspec, CodeDeploy, CI/CD**

**✅ What You’ll Learn:**

* Use Spring Profiles to manage different environments like development, staging, and production
* Leverage buildspec to define the build flow
* Create Pipelines for CI/CD using AWS CodePipeline
* Deploy with CodeDeploy on Elastic Beanstalk

**🎯 Aspect-Oriented Programming (AOP)**

**Duration: 1 Week**  
**Topics Covered: Cross-cutting concerns, AOP Basics, Advice types, Handling Exceptions, JoinPoints, Weaving**

**✅ What You’ll Learn:**

* Learn the fundamentals of Aspect-Oriented Programming (AOP) and how it improves software modularity
* Explore different advice types (before, after, around) to manage the behavior of your application at specified join points
* Discover the weaving process and how aspects are integrated with the main code during compile time, load time, or runtime

**🧠 Caching and Database Transactions**

**Duration: 1 Week**  
**Topics Covered:** **Redis, Spring Cache, Cache Configuration, Transaction Isolation Levels, Transactional Propagation, Database Locking Mechanisms**

**✅ What You’ll Learn:**

* Learn how to integrate Redis for high-performance caching in your Spring Boot applications
* Spring Cache: Understand the Spring Cache abstraction and how to implement caching with ease using Spring Boot
* Distributed Caching: Explore the concepts and implementation of distributed caching to enhance scalability and performance

**📡 Apache Kafka in Spring Boot**

**Duration: 1 Week**  
**Topics Covered:** **Kafka, Spring Boot Messaging, Publisher, Consumer, Broker, Kafka Schema Registry, Kafka UI**

**✅ What You’ll Learn:**

* Discover how to leverage Apache Kafka for building robust and scalable messaging systems in Spring Boot
* Learn about the messaging capabilities in Spring Boot and how to integrate them seamlessly with Kafka
* Explore the differences and similarities between Kafka and RabbitMQ, and learn how to choose the right messaging solution for your Spring Boot application

**🏗️ Microservices Architecture**

**Duration: 2 Weeks**  
**Topics Covered: Eureka Registry, Microservice REST APIs, Circuit Breaker, Resilient4J, Distributed Tracing, Centralized Logs, ELK Stack, Zipkin, Distributed DB Management**

**✅ What You’ll Learn:**

* Learn how to use Eureka Registry for service discovery in a microservices architecture with Spring Boot
* Explore strategies and best practices for securing microservices in a Spring Boot environment
* Learn how to use Resilient4J to build resilient microservices with fault tolerance and latency management
* Explore centralized logging solutions to aggregate and manage logs from all microservices
* Master the ELK Stack (Elasticsearch, Logstash, Kibana) for powerful log analysis and visualization
* Discover how Spring Cloud Sleuth adds tracing capabilities to microservices, integrating seamlessly with Zipkin

**🐳 Docker for Spring Boot Applications**

**Duration: 1 Week**  
**Topics Covered:** **Docker Setup, Docker Compose, Dockerfile, Containerization, Docker Images, Docker Volumes**

**✅ What You’ll Learn:**

* Learn how to set up Docker on your development environment for efficient containerization
* Understand the usage of Docker Compose to manage multi-container applications with ease
* Gain insights into building, managing, and deploying Docker images for consistent application environments

**☸️ Kubernetes Deployment for Spring Boot Applications**

**Duration: 2 Weeks**  
**Topics Covered:** **Kubernetes Dashboard, Deployment, ReplicaSets, Volumes and Volume Claims, Deploying Cluster on Cloud, YAML configuration**

**✅ What You’ll Learn:**

* Learn the essentials of managing Kubernetes clusters, including setting up, scaling, and maintaining cluster resources effectively
* Dive into the core concepts and functionalities of Kubernetes, such as Pods, Deployments, Services, and more, to orchestrate and manage containerized applications at scale
* Explore the Kubernetes Dashboard, a web-based user interface for managing and monitoring Kubernetes clusters, to visualize and interact with cluster resources efficiently

**⏱️ Java Executor Framework & Scheduling**

**Duration: 1 Week**  
**Topics Covered:** **Java Executor Framework, Schedulers, Cron Jobs, Task Scheduling**

**✅ What You’ll Learn:**

* Learn Java Executor Framework to manage asynchronous operations effectively
* Build Cron Jobs and Schedulers to manage asynchronous Operations
* Add Task Scheduling functionalities to handle background tasks in your Spring Boot Apps