Week 1: Introduction to Spring Boot

- **Day 1: Course Introduction**
    - Overview of the Spring Framework
    - Introduction to Spring Boot
    - Key features and advantages of Spring Boot
- **Day 2: Setting Up the Development Environment**
    - Installing Java Development Kit (JDK)
    - Setting up Integrated Development Environment (IDE) (e.g., IntelliJ IDEA, Eclipse)
    - Introduction to Maven and Gradle
    - Creating a Spring Boot project using Spring Initializr
- **Day 3: Spring Boot Project Structure**
    - Understanding the directory structure
    - Application properties and YAML configuration
    - Running and debugging Spring Boot applications

Week 2: Core Concepts

- **Day 1: Dependency Injection and Inversion of Control (IoC)**
    - Overview of Dependency Injection (DI)
    - Configuring beans and component scanning
    - Using @Component, @Service, @Repository, and @Controller annotations
- **Day 2: Spring Boot Starters**
    - Introduction to Spring Boot Starters
    - Commonly used starters (e.g., spring-boot-starter-web, spring-boot-starter-data-jpa)
    - Customizing starters
- **Day 3: Spring Boot Auto-Configuration**
    - Understanding auto-configuration
    - Customizing auto-configuration
    - Disabling specific auto-configuration classes

Week 3: Building RESTful Web Services

- **Day 1: RESTful Principles and HTTP Basics**
    - Understanding RESTful web services
    - HTTP methods (GET, POST, PUT, DELETE)
    - Status codes
- **Day 2: Creating RESTful Services with Spring Boot**
    - Creating REST controllers
    - Handling request parameters and path variables
    - Producing and consuming JSON/XML

- **Day 3: Exception Handling and Validation**
    - Handling exceptions in RESTful services
    - Using @ExceptionHandler and @ControllerAdvice
    - Validating request bodies and parameters using Hibernate Validator

Week 4: Data Access with Spring Data JPA

- **Day 1: Introduction to Spring Data JPA**
    - Overview of Spring Data JPA
    - Configuring data sources and JPA properties
    - Entity creation and mapping
- **Day 2: CRUD Operations with Spring Data JPA**
    - Creating repositories
    - Performing CRUD operations
    - Using derived query methods
- **Day 3: Advanced JPA**
    - JPQL and Native Queries
    - Pagination and Sorting
    - Relationships (One-to-One, One-to-Many, Many-to-One, Many-to-Many)

Week 5: Spring Boot Security

- **Day 1: Introduction to Spring Security**
    - Overview of Spring Security
    - Configuring Spring Security in a Spring Boot application
    - In-memory and JDBC-based authentication
- **Day 2: Securing RESTful Services**
    - Configuring security for REST APIs
    - Role-based access control
    - Using JWT (JSON Web Tokens) for authentication
- **Day 3: OAuth2 and OpenID Connect**
    - Introduction to OAuth2
    - Implementing OAuth2 in Spring Boot
    - Using Spring Security OAuth2 for social logins

Week 6: Advanced Topics

- **Day 1: Spring Boot Actuator**
    - Monitoring and managing Spring Boot applications
    - Using built-in endpoints
    - Customizing Actuator endpoints
- **Day 2: Spring Boot Testing**
    - Introduction to Spring Boot Testing

    - Writing unit tests with JUnit and Mockito
    - Integration testing with Spring Boot
- **Day 3: Microservices with Spring Boot**
    - Introduction to microservices architecture
    - Building microservices with Spring Boot
    - Inter-service communication (REST, gRPC, messaging)

Week 7: Deployment and DevOps

- **Day 1: Building and Packaging Spring Boot Applications**
    - Creating executable JARs and WARs
    - Using Maven and Gradle for builds
    - Managing dependencies
- **Day 2: Containerization with Docker**
    - Introduction to Docker
    - Dockerizing Spring Boot applications
    - Using Docker Compose for multi-container applications
- **Day 3: Deployment Strategies**
    - Deploying to cloud platforms (AWS, Google Cloud, Azure)
    - Using CI/CD pipelines (Jenkins, GitHub Actions)
    - Monitoring and logging

Week 8: Capstone Project

- **Day 1: Project Planning**
    - Choosing a project topic
    - Defining project requirements and scope
    - Setting up the project structure
- **Day 2-5: Project Development**
    - Implementing the project
    - Applying learned concepts (RESTful services, data access, security)
    - Testing and debugging
- **Day 6: Project Presentation**
    - Finalizing the project
    - Preparing a presentation
    - Demonstrating the project to peers/instructors

Additional Resources

- Recommended books and articles
- Online tutorials and courses
- Community forums and support channels