

# Spring Framework

Course code: JAVASPRING

The course focuses on Spring Framework and Spring Boot, currently the most widely used framework for writing web applications in Java. In the course we will first go through Spring container, its services Inversion of Control (IoC), Dependency Injection and Aspect Oriented Programming (AOP), we continue creating a web application using Spring Boot and Spring Web MVC (Rest Controller), integration with the database using JDBC and JPA (Spring Data JPA). Finally, we secure the application with Spring Security.

Affiliate	Duration	Course price	ITB
Praha	5	36 000 Kč	50
Brno	5	36 000 Kč	50
Bratislava	5	1 650 €	50

The prices are without VAT.

## Course terms

Date	Duration	Course price	Type	Course language	Location
T 13.01.2025	5	32 400 Kč	Telepresence	CZ/SK	GOPAS Praha_GTT
T 13.01.2025	5	32 400 Kč	Telepresence	CZ/SK	GOPAS Brno_GTT
T 13.01.2025	5	1 485 €	Telepresence	CZ/SK	GOPAS Bratislava_GTT
T 31.03.2025	5	36 000 Kč	Telepresence	CZ/SK	GOPAS Brno_GTT
T 31.03.2025	5	1 650 €	Telepresence	CZ/SK	GOPAS Bratislava_GTT
T 31.03.2025	5	36 000 Kč	Telepresence	CZ/SK	GOPAS Praha_GTT

The prices are without VAT.

## Required input knowledge

- The course assumes knowledge and experience with programming in Java at the level of the JAVAPROG2 course

## Teaching methods

- Expert explanation with practical examples, exercises on computers.

## Studying materials

- Printed presentations of the subject matter.

## Course syllabus

### Introduction to Spring

- Java Configuration & Spring context
- Annotations @Configuration, @Bean, @Import
- Bean scope (singleton, prototype, ...)
- Create Spring context, launch Spring application and get Spring Bean
- Spring profiles
- External properties

### Dependency Injection using annotations

- Component scanning
- Autowiring using @Autowired
- @Component, @Service, @Controller annotation
- Java Configuration vs. annotation vs. XML configuration (legacy)
- Lifecycle annotations: @PostConstruct, @PreDestroy

#### GOPAS Praha

Kodaňská 1441/46  
101 00 Praha 10  
Tel.: +420 234 064 900-3  
[info@gopas.cz](mailto:info@gopas.cz)

#### GOPAS Brno

Nové sady 996/25  
602 00 Brno  
Tel.: +420 542 422 111  
[info@gopas.cz](mailto:info@gopas.cz)

#### GOPAS Bratislava

Dr. Vladimíra Clementisa 10  
Bratislava, 821 02  
Tel.: +421 248 282 701-2  
[info@gopas.sk](mailto:info@gopas.sk)



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# Spring Framework

- Spring Bean Lifecycle
- Spring Bean Proxies

## Aspect Oriented Programming

- What problems does AOP solve?
- Spring AOP implementation and resulting limitations / implementation features
- Annotations that are based on AOP

## Data Access & JDBC + Spring & JPA (Hibernate)

- JdbcTemplate
- JPA & Spring (Boot)
- Spring Data JPA (JpaRepository interface)
- Entity life cycle

## Database transactions

- @Transactional
- Transaction management & Spring
- Transaction dissemination, commit, rollback

## Spring Boot

- Creating a web Spring Boot application
- Spring Boot starters
- Auto configuration
- Change configuration using properties, yaml, command line parameters
- Packaging Spring Boot application to Docker image
- Spring Boot Actuator & Integration at Prometheus

## Spring application testing

- Spring and TDD (Test Driven Development)
- Spring 5 & integration tests with JUnit 5
- @ActiveProfiles, @Sql
- Testing Spring Boot applications
- Test containers

## Spring MVC and creation of REST applications

- Introduction to REST architecture
- @RestController, @GetMapping, @PostMapping, ...
- Exception handling using @ExceptionHandler and @ControllerAdvice
- OpenAPI (Swagger)
- Three-tier architecture
- DTO (Data Transfer Object) & MapStruct (successor to Dozer, Orika)
- Bean Validation

## Spring Security

- General web application security
- Spring Security configuration
- Certificate configuration for Spring Boot applications
- URL and method level authorization

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Kodaňská 1441/46  
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Tel.: +421 248 282 701-2  
[info@gopas.sk](mailto:info@gopas.sk)



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