Object Oriented Programming (Elective)

Course # COMP 2051

Credits 6

Prerequisites and/or Corequisites: Programming 2 (Java)

Course Description

This Specialization explains high level patterns used in Microservice architectures and the motivation to move towards these architectures and away from monolithic development of applications. Students will learn how Java interacts with databases in a modern framework, using the very popular Spring Boot Framework, with Microservices. Students wishing to develop Java based Web Applications and Restful Micro Services will be using the very popular Spring MVC and Spring Boot frameworks with minimal configuration.

Applied Learning Project

Students will build an extensive application iteratively in a succession of hands on labs. Labs will specifically target the projects Eureka, Ribbon, Hystrix, Feign and Zuul. This is a very hands on course series with a variety of labs to illustrate the key concepts.

LearnQuest Spring Framework Specialization program consists of - 4 course series:

- 1. Specialization course 1: Spring Ecosystem and Core
- 2. Specialization course 2: Spring MVC, Spring Boot, and Rest Controllers
- 3. Specialization course 3: Spring Data Repositories
- 4. Specialization course 4: Spring Cloud Overview

Note: There will be only one mandatory offline class session with the UCA instructor at the beginning. Depending on course progress the number of sessions might change.

Course Learning Outcomes

Upon the completion the course, students will be able to:

- Understand the importance of the Spring Framework in Java development and demonstrate proficiency in configuring object dependency injection using XML, annotations, and Java configuration classes.
- Develop Java-based web applications and RESTful microservices using Spring MVC and Spring Boot frameworks, including creating custom HTTP headers and handling JSON or XML payloads.
- Build and deploy services using URL templates, and understand how these services can be consumed by various clients, such as Java and Angular JS, to illustrate service reuse in a distributed architecture.

- Apply Java Persistence Framework (JPA) and Spring Data Repositories to interact with databases, and learn to expose repositories as REST web services using HATEOAS concepts.
- Utilize Spring Aspect-Oriented Programming (AOP) for applying cross-cutting concerns like logging in a centralized manner, and understand Spring's transaction management and declarative transaction configuration.
- Explore microservice architecture patterns and their benefits over monolithic development, and implement these patterns using Spring Cloud and Netflix OSS technologies.
- Gain hands-on experience with Spring Cloud projects like Eureka, Ribbon, Hystrix, Feign, and Zuul to implement microservice components such as service registration, discovery, client-side load balancing, circuit breakers, and gateway services.

Item	Weight %
Specialization course 1:	10
Offline assessment-1	5
Specialization course 2:	15
Offline assessment-2	5
Examination	15
Specialization course 3:	10
Offline assessment-3	5
Specialization course 4:	10
Offline assessment-4	5
Examination	10
Project	10

Course Assessments and Grading