FACULTY OF ENGINEERING, DESIGN AND TECHNOLOGY
DEPARTMENT OF COMPUTING AND TECHNOLOGY
ADVENT 2024 SEMESTER <u>EXAMINATION</u>

PROGRAM: *Bachelor of Science in Computer Science*

YEAR: 3, **SEMESTER:** 2

COURSE CODE: *SYE3209*

COURSE NAME: *Software Construction*

EXAMINATION TYPE: *PROJECT-BASED EXAM*

PROJECT DURATION: APRIL

TIME ALLOWED: *2 Weeks*

Examination Instructions

1. The general Uganda Christian University examination guidelines and academic & financial policies apply to this examination. Violating any of the policies by the student automatically makes this examination attempt void, even if you have completed and submitted the answer booklet.
2. This exam consists of a project to be executed in two weeks.
    i. Assessment of the project shall be based on five milestones, evaluated during the duration of the project. Each milestone shall be evaluated out of 20 marks.
3. Every student has a responsibility to prove their contribution towards every milestone, and marks may be awarded to every student individually.

PART A:

PROJECT DESCRIPTION (*Please describe the projects clearly so that the students can understand it*)

Develop an advanced bookstore inventory system focusing on the API side only using Spring Boot. The system should provide a robust API for managing books, authors, categories, and orders. It should adhere to modern software construction principles and practices, emphasizing clean code, modularity, SOLID principles, and comprehensive API documentation. The project is divided into multiple milestones, and candidates have two weeks to complete the project.

PART B: Project-based assessment guidelines

S/N	Milestone Description	Maximum Marks
1	**MILESTONE ONE: Setup and Configuration** • Set up a new Spring Boot project using Spring Initializr, incorporating modern dependencies such as Spring Web, Spring Data JPA, and Spring Security. • Configure database integration with an appropriate relational database (e.g., MySQL, PostgreSQL) using Hibernate. • Implement basic CRUD operations for managing books, authors, and categories following RESTful API design principles. • Ensure separation of concerns and adherence to SOLID principles in the initial project setup.	20 %
2	**MILESTONE TWO: Authentication and Authorization** • Implement user authentication and authorization using Spring Security, JWT authentication, and role-based access control (RBAC). • Design and implement secure endpoints for user registration, login, and role management. • Secure API endpoints based on user roles, ensuring proper authentication and authorization mechanisms.	20 %
3	**MILESTONE THREE: Order Management** • Develop features for managing orders, including order creation, retrieval, update, and cancellation. • Implement order-related endpoints adhering to RESTful API best practices, with proper request and response handling. • Ensure that only authenticated users can place orders and that order-related operations are performed securely.	20 %
4	**MILESTONE FOUR: Advanced Features and Enhancements** • Implement additional features such as search functionality, pagination, and filtering for books, authors, and categories. • Enhance error handling and validation for user inputs, providing meaningful error messages and proper HTTP status codes. • Implement versioning for APIs to handle backward compatibility and API evolution gracefully.	20 %
5	**MILESTONE FIVE: Testing, Documentation, and CI/CD**	20 %

	• Write comprehensive unit tests to ensure the correctness and reliability of implemented features, utilizing tools such as JUnit and Mockito. • Generate detailed API documentation using tools like Swagger or Springfox, documenting API endpoints, request/response structures, and usage examples. • Document the project setup, architecture, design decisions, and any other relevant information in a clear and concise manner. • Implement CI/CD pipelines in automating build, test, and deployment processes	
	TOTAL MARKS	**100 %**

~END OF EXAM GUIDELINES~