

THE UNIVERSITY OF THE GAMBIA



ADVANCED APPLICATION DEVELOPMENT — PROJECT REQUIREMENTS (3RD DECEMBER, 2025)

1. Project Overview and Objectives

In this project, you are required to **design and develop a real-world application using Java and Spring Boot**. The project evaluates your ability to build a modern backend system, implement secure APIs, integrate a database, and follow good software engineering principles.

Your application must demonstrate:

- Java programming proficiency
- Spring Boot backend development
- REST API design and documentation
- Database integration
- Clean architecture and modular design

Group Work:

Projects must be completed in **groups of three (3)**.

Each group must include a “**Team Roles & Contributions**” section in the report, clearly stating what each member worked on.

2. Project Requirements

A. Backend Development (Spring Boot) — **COMPULSORY**

You are required to develop a complete backend system using **Spring Boot** with the following features:

1. User Authentication (Required)

Implement secure user authentication using:

- Spring Security
- JWT (JSON Web Tokens)
- Password hashing

2. Minimum of Two Main Entities

Each entity must support full **CRUD operations** using RESTful API design.

3. REST API Requirements

Your backend must:

- Follow REST principles
- Use proper naming conventions
- Return JSON responses
- Use proper HTTP status codes (200, 201, 400, 404, 500)
- Include at least **8 meaningful API endpoints**

4. Database Integration

Use **MySQL**.

Your database must include:

- At least two related tables
- Proper relationships (One-to-One, One-to-Many, or Many-to-Many)
- At least 10 sample records per table
- Constraints where relevant (NOT NULL, UNIQUE, FK)

5. Business Logic

Include at least **two** meaningful business rules.

Examples:

- Prevent duplicate bookings
- Validate schedule/appointment overlaps
- Automatically compute totals (e.g., invoice total)
- Prevent deleting records that have dependencies

B. Frontend Integration — *OPTIONAL*

Frontend development is **optional**.

If your group chooses to build a frontend, you may use:

- React, Angular, Vue, Simple HTML/CSS/JS

Groups that do not build a frontend must test APIs using Postman, Swagger UI, or any API tool.

3. Project Report (PDF)

You must submit a well-written and organized project report containing:

Report Structure

1. **Title Page:** Project title, student names, IDs, course code, date
2. **Introduction:** Overview of the system and objectives
3. **System Features & Requirements**
4. **ERD / Database Schema:** Screenshot + explanation
5. **API Endpoints Table:** Method, URL, description
6. **Authentication Explanation:** Brief explanation of JWT process
7. **Business Logic Implementation**
8. **Screenshots**
 - API testing (Postman, Swagger)
 - Database tables
 - Optional: frontend pages

9. Team Roles & Contributions

- Clear breakdown of who did what

4. Submission Details

Submit the following on Google Classroom:

Required Files

- GitHub repository link containing:
 - Spring Boot project
 - SQL script (database creation + sample data)
 - Optional frontend
- PDF Project Report

Deadlines

- **Project Submission:** *11th January, 2026*
- **Final Presentation:** *Will be communicated*

Late submissions attract penalties.

5. Presentation Requirements

During the presentation, your group must demonstrate:

- Authentication (login/registration)
- CRUD operations on main entities
- Explanation of API endpoints
- Database structure and relationships
- Business logic in action
- Optional: frontend demonstration
- Clear explanation of contributions

6. Grading Rubric

Component	Marks
Backend Functionality (Spring Boot)	30
API Design	15
Database Integration (MySQL)	15
Architecture & Exception Handling	10
Report Quality	15
Presentation & Demo	15
TOTAL	100

7. Plagiarism Policy

Any plagiarism will result in a *50% deduction* of total marks.

ALL THE BEST