# Title: Student Gradebook - Project Report

**Author**: Ngô Tấn Tài, **Student ID**: AUS15125, **Class**: AUSV0102
**Date**: November 2025
**Language**: Python 3
**Instructor**: Mr. Anh Minh Hoang
**School**: Asia University Vietnam

---

## 1. Project Objectives

The goal of this project is to design and implement a simple **gradebook management system** using Python.
The program allows users to:
- Add, update, and delete courses
- View all recorded courses
- Calculate GPA for a single semester or for all semesters
- Save and load data using JSON for persistence

This project demonstrates my understanding of:
- Python dictionaries and loops
- File input/output
- JSON serialization
- Modular programming and user interface design

---

## 2. System Design

### 2.1 Data Structure

All courses are stored in a dictionary called `courses`, where the key is the course code (e.g., `"MA101"`) and the value is another dictionary containing details such as course name, credits, semester, and score.
Example: {"MA101": {"name": "Calculus I", "credits": 4, "semester": 1, "score": 85}}

### 2.2 File Storage

- Data is stored in `gradebook.json`.

- The program automatically loads data when it starts and saves whenever changes occur.
- JSON format ensures compatibility and readability.

### 2.3 Functions Overview

| Function | Description |
|---|---|
| `add_course()` | Adds a new course entry |
| `update_course()` | Edits course details |
| `delete_course()` | Removes a course |
| `view_book()` | Displays all courses |
| `calc_GPA_by_semester()` | Calculates GPA for one semester |
| `calc_overall_GPA()` | Calculates total GPA across all semesters |
| `save_data()` / `load_data()` | Handle JSON storage |

## 3. Usage Example

**Running the program:**

```
python student_gradebook_cli.py
```

**Example menu:**


**Example usage examples:**

**View gradebook:**

```
----- Courses details -----
Code     Name                Credits  Semester   Score
-----------------------------------------------------
AU003    English 1           3        3          71
MA101    Calculus I          4        1          85
CS102    Programming Basics  3        1          92
PH103    Physics I           4        1          76
EC201    Microeconomics      3        2          88
```

**Calculate GPA:**

```
5. Calculate GPA
6. Exit gradebook
Choose an option: 5
Would you like to continue? Type 'Quit' to exit, press Enter to continue:
Enter the semester you want to calculate the semester for: 1
GPA for semester 1: 83.64
Overall GPA: 82.46
```

# 4. Test Results

| Test Case | Action | Expected Result | Pass |
|---|---|---|---|
| Add new course | Adds CS102 | Course appears in JSON | ✅ |
| Update course score | Change CS102 score to 95 | Updated value saved | ✅ |
| Delete course | Remove CS102 | Entry deleted from JSON | ✅ |
| Calculate GPA | For semester 1 | Accurate GPA displayed | ✅ |
| Load saved data | Restart program | Data restored successfully | ✅ |

---

# 5. Conclusion

The Student Course Gradebook project successfully implements a functional grade management system using Python. It meets the learning objectives of working with data structures, file handling, and user interaction.

Future improvements may include better input validation, GUI development, and GPA scale flexibility.