

## Functional Requirements for the Student Grade Management System:

- R1. The system shall allow a user to add a Student Grade record to database.
  - 1.1. The system shall display a main menu to the user.
  - 1.2. The user shall select “Add Record” button to add a new record.
  - 1.3. The system shall display a New Grade Record form to the customer.
  - 1.4. The user shall fill the form.
    - 1.4.1. The user shall enter student id, course prefix, course number, grade, year and semester.
    - 1.4.2. The user shall click “Submit” button after entering the data.
    - 1.4.3. The system shall check if any of the data is missing.
      - 1.4.3.1. If any of the data is missing, the system shall display a message to the user and repeat Step 1.4.
      - 1.4.3.2. If all the data are correct, the system shall continue.
  - 1.5. The system shall verify if the record is already in the database.
    - 1.5.1. The system shall try to retrieve a record with the data except for “Grade.”
      - 1.5.1.1. If a record is retrieved, the system shall display an error message to the user, and check if the user wishes to update the record.
        - 1.5.1.1.1. If the user wishes to update the record, the existing record will be updated. (Refer to R2.2.5)
        - 1.5.1.1.2. If the user wishes not to go further, the system shall display a message to the user and return to main menu.
      - 1.5.1.2. If no record is retrieved, the system shall continue.
  - 1.6. The system shall add the new record to the database.
  - 1.7. The system shall recalculate the overall GPA for the student.
  - 1.8. The system shall update the overall GPA in the database for the student.
  - 1.9. The system shall display a message and return to main menu.
- R2. The System shall allow a user to edit a Student Grade Record in the database which includes changing or deleting the value of the grade column for a Student Grade Record in the database and/or adding the value of a grade column for a Student Grade Record in the database.
  - 2.1. The system shall display a main menu to the user.
  - 2.2. The user shall select the “Edit Record” button to edit an existing record.
  - 2.3. The system shall display a Search for Student Grade Record form to the customer.
  - 2.4. The user shall fill the form.
    - 2.4.1. The user shall search for an existing Student Grade Record to be edited.
      - 2.4.1.1. The user shall enter the Student ID and Course Information (Course Prefix, Course Number, Year, and Semester) to be used as parameters in the selection query to retrieve the Grade Record.
      - 2.4.1.2. The user shall click the “Search” button to retrieve the Student Grade Record.
      - 2.4.1.3. The system shall verify that the Student Grade Record exists in the database.
        - 2.4.1.3.1. The system shall attempt to retrieve the Student Grade Record from the Student Grades table in the database.
          - 2.4.1.3.1.1. If the record is returned, the system shall continue.

- 2.4.1.3.1.2. If the record is not returned, the system shall display an error message and prompt the user to check if she wishes to add a new record to the database.
- 2.4.1.3.1.2.1. If the user wishes to add a new record to the database, the new record will be added (Refer to R1.1.3).
- 2.4.1.3.1.2.2. If the user wishes not to go further, the system shall display a message to the user and return to the main menu.
- 2.4.1.3.2. The system shall display the retrieved record to be edited by the user.
- 2.5. The system shall display an Edit Grade Record form to the user.
- 2.6. The user shall fill the form.
  - 2.6.1. The user shall modify/update the value of the grade column for the retrieved Student Grade Record.
  - 2.6.2. If the user wishes to modify/update any of the columns other than the grade column for the Student Grade Record, a new Student Grade Record will need to be added to the system (Refer to R1.1.3).
- 2.7. The user shall click the “Submit” button after the modifications/updates are completed.
- 2.8. The system shall validate modified grade value.
  - 2.8.1. The system shall check if any of the required data is missing.
    - 2.8.1.1. If any of the required data is missing, the system shall display an error message and repeat step 2.3.
    - 2.8.1.2. If the required data is provided, the system shall continue.
- 2.9. The system shall update the Student Grade Record with the edited grade information.
- 2.10. The system shall recalculate the overall GPA for the student the Student Grade Record is associated with.
- 2.11. The system shall update the overall GPA in the database for the student.
- 2.12. The system shall display a confirmation message when the task is completed and return to the main menu.
- R3. The system shall enable a user to print a semester report card or complete transcript for a given student.
  - 3.1. The system shall display a main menu to the user.
  - 3.2. The user shall select the “Print Student Grades” button to generate a report card or transcript.
  - 3.3. The system shall display a Select Student form to the user.
  - 3.4. The user shall fill the form
    - 3.4.1. The user shall enter the Student ID and for the student to generate a report card or transcript for.
      - 3.4.1.1. The user shall enter the student ID in the designated field.
      - 3.4.1.2. The user shall click the “Search” button to retrieve the student’s information.
      - 3.4.1.3. The system shall verify that a Student Record exists in the database for the student ID being searched for.
        - 3.4.1.3.1. The system shall attempt to retrieve the Student Record from the Student Information table in the database
          - 3.4.1.3.1.1. If the record is not returned, the system shall display a message to the user and repeat step 3.4.

- 3.4.1.3.1.2. If the record is returned, the system shall continue.
- 3.5. The system shall prompt the user to select “Print Transcript” or “Print Report Card”.
  - 3.5.1. If the user clicks on “Print Transcript”, the system shall verify that Student Grade Records exist for that student.
    - 3.5.1.1. The system shall attempt to retrieve all Student Grade Records from the Student Grades table in the database for the student ID provided by the user.
      - 3.5.1.1.1. If no records are retrieved, the system shall display a message notifying the user that no records for that student exist and return to the main menu.
      - 3.5.1.1.2. If records are retrieved, the system shall continue to step 3.6.
    - 3.5.2. If the user clicks on “Print Report Card”, the system will display a Select Semester and Year form to the user.
    - 3.5.3. The user shall fill the form.
      - 3.5.3.1. The user shall enter the year and semester to generate a report card for.
        - 3.5.3.1.1. The user shall enter the semester and year in the designated field.
        - 3.5.3.1.2. The user shall click the “Search” button to retrieve the information for that student, year, and semester.
        - 3.5.3.1.3. The system shall verify that Student Grade Records exist for that student, for that year, and for that semester provided by the user.
          - 3.5.3.1.3.1. The system shall attempt to retrieve the Student Grade Records for that year and semester from the Student Grades table in the database.
            - 3.5.3.1.3.1.1. If the records are not returned, the system shall display a message to the user and repeat step 3.5.3.
            - 3.5.3.1.3.1.2. If the records are returned, the system shall continue to step 3.6.
- 3.6. The system shall generate a printable report containing the student’s name, ID, overall GPA, and a list of courses and grades retrieved from steps 3.5.#.
- 3.7. The system shall display the report to the user for preview.
- 3.8. The user shall have the option to print the report card.
  - 3.8.1. The user shall select the “Print” button to print the report or “Cancel” button to return to the main menu.
    - 3.8.1.1. If the user clicks the “Cancel” button, the system shall return to the main menu.
    - 3.8.1.2. If the user clicks the “Print” button, the system shall provide the option to save the report as a PDF file.
      - 3.8.1.2.1. The user shall click the “Save as PDF” button to save the report.
        - 3.8.1.2.1.1. The system shall produce a PDF file containing the contents of the report for the user to download.
- 3.9. The system shall display a confirmation message and return to the main menu.

Possible non-functional requirements:

- 1. Performance:
  - 1.1. The system shall respond in a timely manner.

- 1.2. The system shall handle a large volume of records
  - 1.3. The system shall handle records efficiently.
2. Reliability:
  - 2.1. The system shall accurately store and retrieve data from the database without loss or corruption.
  - 2.2. The system shall handle errors and provide detailed error messages to the users.
3. Usability:
  - 3.1. The system shall have a user-friendly GUI.
  - 3.2. The system shall provide clear instructions or guidance for tasks.
4. Security:
  - 4.1. The system shall allow only authorized users to access and modify records.
  - 4.2. The system shall protect sensitive data from unauthorized access.
5. Scalability:
  - 5.1. The system should be designed to support growth in the number of students and courses.
6. Compatibility:
  - 6.1. The system should be compatible with different versions of Excel files to support changes in file format.
7. Data Integrity:
  - 7.1. The system shall validate records to preserve accuracy and consistency of the data entered into the database.
  - 7.2. The system shall routinely backup the database to prevent data loss for disaster recovery.
8. Accessibility:
  - 8.1. The system should adhere to accessibility standards to accommodate users with disabilities.
9. Maintainability:
  - 9.1. The system should be designed with modular, well-documented code to facilitate enhancements and maintenance.
  - 9.2. The system should maintain error logging mechanisms for tracking, debugging, and troubleshooting.
10. Integration:
  - 10.1. The system should support integration with other applications for seamless data exchange.