Software Requirements Specification

For

University Communication and Services Portal with Campus Management System and SMS Gateway Integration

Version <4.0>

Group No.: 5 (TT4L)

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Revisions History

| Version | Primary Author(s) | Description of Version | Date Completed |
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| 1.0 | Yong Di Lun | Added template for SRS | 2025-04-18 |
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# Introduction

Nowadays, effective communication and streamlined access to information are crucial for institutional success. Hence, the University Communication and Services Portal is designed to bridge the gap between students, lecturers, administrators, and parents. This portal offers real-time access to critical data such as academic performance, attendance records and billing information through a user-friendly interface.

To further enhance responsiveness, the system integrates with an SMS Gateway to enable the delivery of important notifications. Alerts such as low attendance warnings, fee payment reminders and academic progress updates are sent directly to students and parents. This ensures timely information sharing, fosters greater accountability, and strengthens the partnership between the university and its stakeholders. Ultimately, the portal aims to promote transparency, improve communication, and support the academic community.

## Purpose

The purpose of the University Communication and Services Portal is to improve the flow of information between the university and its stakeholders—students, lecturers, administrators, and parents. The portal supports students in managing their academic responsibilities and enables lecturers and administrators to communicate updates efficiently. It also keeps parents informed about their children's academic progress and financial status.

By centralizing access to vital information, the system reduces communication gaps and promotes transparency. Its integration with an SMS Gateway ensures that important messages—such as attendance alerts, fee reminders, and academic updates—are delivered to users in real time, regardless of their location.

This document is intended for all key stakeholders, including students, lecturers, administrators, and parents, as part of a broader effort to foster accountability and create a more organized and responsive educational environment.

## Scope

The University Communication and Services Portal is designed to simplify and enhance access to academic and administrative services. It complements the existing Campus Management System (CMS) by offering a user-friendly interface and essential features for daily operations. The system also integrates with an SMS Gateway to ensure timely communication.

**Supported Role-Based Functionalities:**

* **Students**:
  + View subject details, academic grades, and class schedules.
  + View Notifications and report system issues.
* **Lecturers**:
  + Manage student attendance, grades, and notifications.
  + Monitor student performance and receive alerts for at-risk students.
* **Administrators**:
  + Manage user roles, access logs, fee reports, enrollment statistics, and analytics.
  + Generate system reports.
* **Parents**:
  + Receive SMS updates on attendance, academic performance, and billing.
  + No direct portal access required.

The portal ensures secure, role-based access, protects data confidentiality, and complies with institutional policies.

## Product Overview

The University Communication and Services Portal is a comprehensive, web-based platform designed to unify and streamline communication and services within the university.

**Key Features and Benefits:**

* **Centralized Access**:
  + Real-time access to academic records, attendance, and billing information.
* **Multi-Stakeholder Integration**:
  + Supports students, lecturers, administrators, and parents.
* **Seamless CMS Integration**:
  + Ensures accurate and synchronized data with the existing Campus Management System.
* **SMS Gateway Support**:
  + Sends timely notifications including attendance alerts, fee reminders, and progress summaries.
* **Secure Role-Based Access**:
  + Tailors access and visibility according to user roles to ensure data privacy.
* **Intuitive Interface**:
  + User-friendly design with real-time updates for efficient decision-making.

**Overall Impact:**

* Promotes transparency and accountability.
* Enhances academic monitoring and institutional communication.
* Improves efficiency and stakeholder engagement across the university.

### Product Perspective

The University Communication and Services Portal is an extension of the existing digital infrastructure. Besides, this product also designed to enhance the capabilities of the current Campus Management System (CMS). Rather than replacing existing systems, this portal serves as a communication and service interface to pull data from the CMS and presents it in a user-friendly format for various stakeholders.

This portal acts as a middleware solution which integrates backend systems and frontend user experiences. It leverages existing databases and APIs from the Campus Management System to ensure real-time synchronization of academic records, attendance data and financial information. Additionally, it incorporates an SMS Gateway to enable automated dispatch of important alerts and updates to users.

From a system architecture standpoint, this portal is modular which is designed to support future enhancements such as mobile app integration, multi-language support or the inclusion of new service modules. Overall, the portal is positioned as a bridge between core administrative systems and end users to improve service delivery and communication throughout the university ecosystem.

Additionally, the portal may use SMTP protocol to communicate with an email server, enabling the delivery of email notifications and system alerts. The use of standard communication protocols ensures compatibility, scalability and secure interaction with external systems and services. These interfaces provide transparent, timely and efficient communication within the university ecosystem.

#### Memory Constraints

**Server Side**

* Application server:
  + Minimum of **16 GB RAM** recommended.
  + Supports **concurrent sessions, real-time data retrieval**, and **SMS Gateway communication.**
  + Optimized for **peak usage** (e.g., exam result releases, fee deadlines).
* Database server:
  + Ideally **32 GB RAM or more**.
  + Handles large volumes of **academic, attendance**, and **financial records.**

**Client Side**

* Devices: **Desktops, laptops, tablets, smartphones.**
* Minimum requirement: **2 GB RAM** and **modern web browser**.
* Optimized as a **web-based application** to reduce local resource usage.

**System Optimization**

* Uses **data caching** and **session management**.
* Designed for **consistent performance** and **user satisfaction**.

#### Operations

* 24/7 availability for academic and administrative services
* Hosted on reliable infrastructure (on-premises or cloud-based)
* Routine operations:
  + User authentication
  + Real-time synchronization with Campus Management System
  + Automated SMS notifications based on triggers (e.g., low attendance, fee deadlines)
* Administrator responsibilities:
  + Manage user roles and monitor system performance.
  + Handle data backups and apply security patches or updates.
  + Schedule maintenance tasks (e.g., database optimization, log management) during off-peak hours
* User-facing operations:
  + Login/logout
  + Dashboard navigation
  + Viewing data and managing notifications
  + User-friendly interface requiring minimal training.

#### Site Adaptation Requirements

* Supports deployment on either on-premises servers or cloud infrastructure.
* Hosting environment must provide:
  + Reliable internet connection
  + Adequate power supply
  + Physical or virtual servers with sufficient CPU, memory, and storage
* Software requirements:
  + Compatible operating systems: Linux or Windows Server
  + Relational database: e.g., MySQL
  + Application server: e.g., Node.js or Java
* SMS Gateway integration:
  + Physical: space and network for GSM modems
  + Cloud-based: outbound internet access and API support
* Compatibility with:
  + Existing Campus Management System
  + Authentication infrastructure
  + Network configuration and security policies
* Training for site personnel on:
  + Administration
  + Updates
  + Basic troubleshooting

#### Interface with Services

* Campus Management System:
  + Provides academic, attendance, and billing data.
  + Accessed via direct database connections.
* SMS Gateway:
  + Sends automated messages (e.g., alerts, reminders)
  + Uses standard HTTP communication.
* Authentication and authorization:
  + Integration with Single Sign-On (SSO) systems.
  + Role-based access to portal features and data.
* Additional service interfaces:
  + Email via SMTP for reports and notifications.
  + Payment gateways for student billing.
  + Ensures a fully connected platform to enhance communication and user engagement.

### Product Functions

The **University Communication and Services Portal** provides a comprehensive set of functions that support academic, administrative and communication across the university community. Table below are the descriptions of functions.

|  |  |  |  |
| --- | --- | --- | --- |
| No. | Functions | Description | Accessible Role |
| 1 | View Subject Details | Allows users to access detailed information about subjects | Student |
| 2 | View Academic Grades | Allows students to view their grades | Student |
| 3 | View Class Schedule | Displays the class schedule for the student | Student |
| 4 | View Notification | View notification | Student |
| 5 | Report System Issues | Allows users to report technical problems | Student, Lecturer |
| 6 | Manage Notifications | Enables lecturers and admin automate notifications to students and their parent | Lecturer, Admin |
| 7 | Manage Grades | Allows lecturers to enter or update student grades | Lecturer |
| 8 | Manage Attendance | Enables lecturers to track and record attendance | Lecturer |
| 9 | View Student Progress | Allows lecturers to monitor the academic progress of students | Lecturer |
| 10 | Receive At-Risk Student Alerts | Notifies lecturers about students who may be at academic risk | Lecturer |
| 11 | Manage User Role | Administers user role assignments and permissions | Administrator |
| 12 | Monitor System Access Logs | Tracks and audits system access activity | Administrator |
| 13 | Generate Fee Reports | Creates financial reports related to student fees | Administrator |
| 14 | View Enrollment Statistics | Shows data on student enrollment figures | Administrator |
| 15 | View Advanced Analytics Dashboard | Provides advanced data insights and analysis | Administrator |
| 16 | View System Issue | View system issue report by student or lecturer | Administrator |

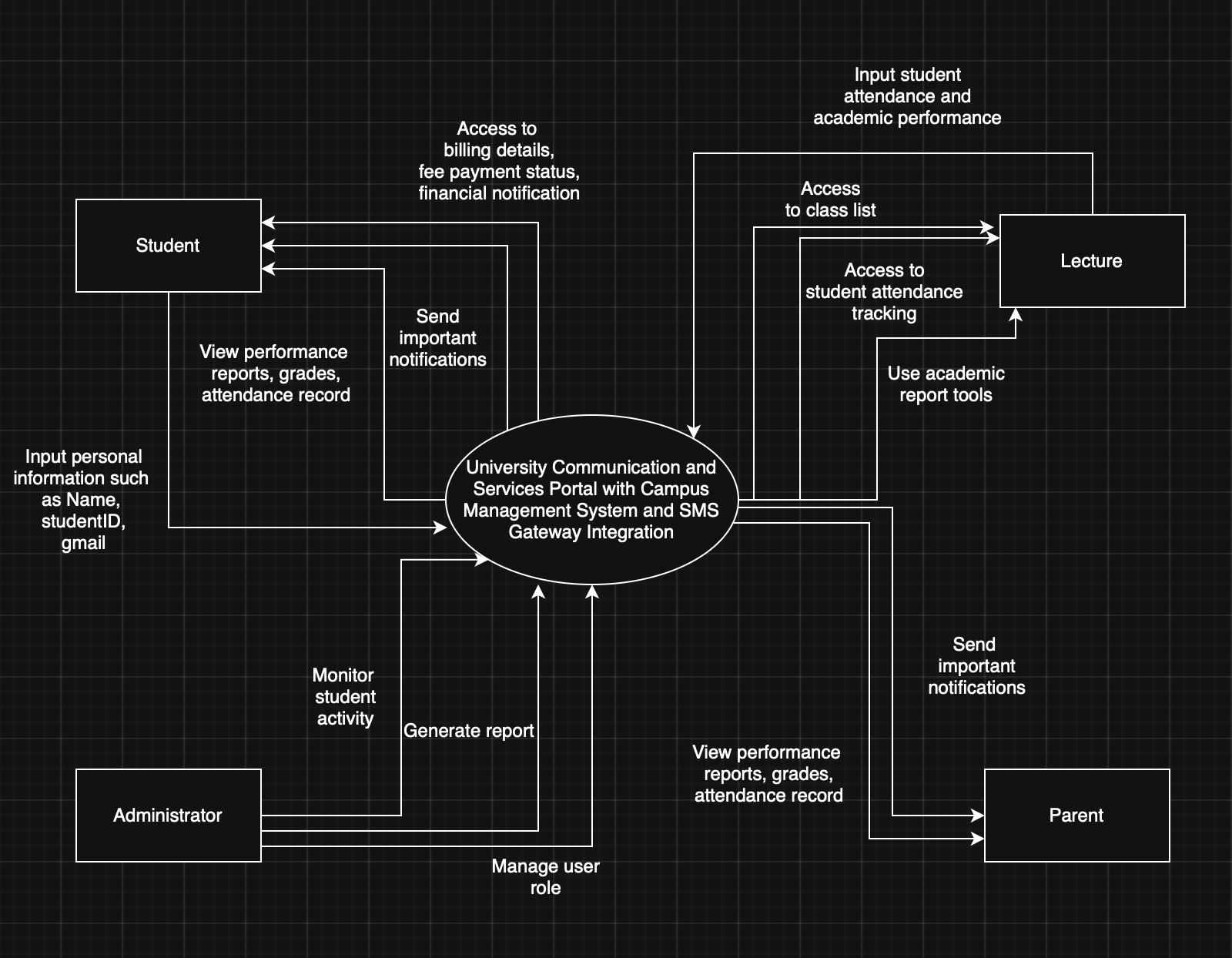


Figure above illustrates the context diagram of University Communication and Services Portal with Campus Management System and SMS Gateway Integration.

Link: <https://app.diagrams.net/#Hangelphoon7%2FSRS%2Fmain%2FUntitled%20Diagram.drawio%23%7B%22pageId%22%3A%22C5RBs43oDa-KdzZeNtuy%22%7D>

### User Characteristics

The University Communication and Services Portal is designed to accommodate a diverse range of users with varying levels of technical proficiency, educational backgrounds, and responsibilities. The primary user groups include students, lecturers, administrators and parents, each with distinct needs and access rights.

|  |  |
| --- | --- |
| Role | Description |
| Student | Students are typically digital natives which familiar with online platforms and mobile devices. They require intuitive access to academic records, attendance information, billing details and notifications. Their interaction with the portal is frequent, particularly during registration periods, assessment times, and fee deadlines. |
| Lecture | Lecturers are academic staff members who use the portal to manage course-related information, view student attendance and monitor academic performance. While many lecturers are comfortable with technology, the portal is designed to support varying levels of digital literacy by offering a clear, user-friendly interface and role-specific features. |
| Administrator | Administrators are responsible for managing system configurations, user accounts, reporting tools and institutional data. This group generally possesses a higher level of technical knowledge and may require access to advanced features such as data exports, user activity logs and system alerts. |
| Parent | Parents represent a user group with potentially limited exposure to educational portals. They primarily use the system to monitor their child’s academic progress, attendance, and financial obligations. To accommodate this, the portal does not include a dedicated interface for parents. Instead, the system delivers well-structured SMS messages containing summarized information, along with attached files when necessary (e.g., grade reports, fee statements). This approach ensures parents receive timely and accessible updates without the need to navigate the system directly. |

### Limitations

* **Dependence on Campus Management System (CMS):**
  + Portal relies heavily on integration with the CMS.
  + Any inaccuracies, downtime, or delays in the CMS affect data quality and timeliness.
  + The portal does not modify or enhance CMS functionality—only retrieves and displays data.
  + Limits flexibility in implementing advanced features.
* **Internet Connectivity Requirements:**
  + As a web-based system, stable internet is required for access and functionality.
  + Users in areas with poor infrastructure or during outages may face accessibility issues.
* **SMS Notification Constraints:**
  + Dependent on external SMS carriers and their availability.
  + Prone to message delivery failures or delays.
  + Limited message length and formatting restrict detailed communication.
* **Security and System Updates:**
  + Role-based access and encryption are in place, but ongoing threats require regular updates and monitoring.
  + Potential vulnerability to common web-based security threats if not maintained properly.
* **Limited Support for Custom Features:**
  + Highly customized workflows and complex reporting are not supported without additional development.
* **Digital Literacy Barriers:**
  + Users with limited technical skills may experience a learning curve when using the system.

## Definitions

# References

# Specific Requirements

## Functions

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The general functional requirement for the system is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F001 | Version | 1.0 |
| Description | When the user session times out due to inactivity, the system shall automatically log out the user and redirect them to the login screen. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F002 | Version | 1.0 |
| Description | When a user attempts to access a restricted feature, the system shall verify user roles and deny access if the user lacks the required privileges. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F003 | Version | 1.0 |
| Description | When the system encounters an error during processing, it shall log the error details and display a user-friendly error message. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F004 | Version | 1.0 |
| Description | When an API request is made to the system, the system shall authenticate and validate the request before processing. | | |
| Author | Yong Di Lun | | |

### F001 Login

The functional requirement for Login is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F101 | Version | 1.0 |
| Description | When a user opens the login page, the system shall provide the user with the ability to enter their username and password. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F102 | Version | 1.0 |
| Description | When a user submits login credentials, the system shall verify the username and password against stored records. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F103 | Version | 1.0 |
| Description | When a user enters valid login credentials, the system shall grant access to the portal and redirect the user to their dashboard. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F104 | Version | 1.0 |
| Description | When a user enters invalid credentials, the system shall display an error message stating "Invalid credentials. Please try again." | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F105 | Version | 1.0 |
| Description | When a user fails to log in after 3 attempts, the system shall lock the account for 5 minutes. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F106 | Version | 1.0 |
| Description | When an account is locked, the system shall deny further login attempts until the 5-minute lockout period expires. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC001 | | Version | 1.0 |
| Feature | F001 Login | | | |
| Purpose | To allow users (Students, Lecturers, Administrators) to authenticate and access the portal. | | | |
| Actor | Student, Lecturer, Administrator | | | |
| Trigger | User enters login credentials and submits the login form. | | | |
| Precondition | User must be registered in the system. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | User navigates to the login page. | | |
| 2 | User enters username and password. | | |
| 3 | System verifies the credentials. | | |
| 4 | System grants access and redirects user to the dashboard. | | |
| Alternate Flow – Invalid Credentials | 4.1 | User enters invalid username or password. | | |
| 4.2 | System displays error message 'Invalid credentials. Please try again.' | | |
| 4.3 | User retries login up to 3 times. | | |
| 4.4 | System locks the account after 3 unsuccessful attempts for 5 minutes | | |
| Rules | Username and password must match a registered user record. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F002 View Class Schedule

The functional requirement for View Class Schedule is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F201 | Version | 1.0 |
| Description | When a logged-in student selects "View Class Schedule," the system shall retrieve their class schedule data from the academic database. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F202 | Version | 1.0 |
| Description | When schedule data is retrieved, the system shall provide the student with the ability to view it in a tabular or calendar format. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F203 | Version | 1.0 |
| Description | When a schedule entry is displayed, the system shall include the course name, time, location, and lecturer. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F204 | Version | 1.0 |
| Description | When the student has no classes scheduled, the system shall display the message: "No class schedule available." | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC002 | | Version | 1.0 |
| Feature | F002 View Class Schedule | | | |
| Purpose | To allow students to view their class timetable including time, subject, location, and lecturer. | | | |
| Actor | Student | | | |
| Trigger | Student selects "View Class Schedule" from the portal menu. | | | |
| Precondition | Student must be logged in. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Student selects "View Class Schedule" from the student portal. | | |
| 2 | System retrieves the schedule data from the academic system. | | |
| 3 | System displays the class schedule, including course names, times, locations, and lecturers. | | |
| Alternate Flow – No class schedule found | 3.1 | If no schedule is found, the system displays a message: "No class schedule available." | | |
| Rules | Schedule data must be up-to-date and reflect the student’s current enrollment. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F003 View Subject Detail

The functional requirement for View Subject Detail is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F301 | Version | 1.0 |
| Description | When a logged-in student selects a subject from the class schedule, the system shall retrieve detailed subject information from the academic database. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F302 | Version | 1.0 |
| Description | When data is retrieved, the system shall display the subject code, name, credit hours, description, prerequisites, and lecturer information. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F303 | Version | 1.0 |
| Description | When subject details are not available, the system shall display the message: "Subject details not found." | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC003 | | Version | 1.0 |
| Feature | F003 View Subject Detail | | | |
| Purpose | To allow students to view detailed information about a selected subject including its description, credits, prerequisites, and lecturer. | | | |
| Actor | Student | | | |
| Trigger | Student selects a subject from the class schedule view. | | | |
| Precondition | Student must be logged in | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Student selects a subject from the class schedule interface. | | |
| 2 | System retrieves the subject detail data from the academic system. | | |
| 3 | System displays the subject details including code, name, credits, description, prerequisites, and lecturer. | | |
| Alternate Flow – Subject details not found | 3.1 | If no details are found, the system displays a message: "Subject details not found." | | |
| Rules | Subject detail data must be accurate and match the academic records for the current semester. | | | |
| Author | Yong Di Lun | | | |

### F004 View Academic Grade

The functional requirement for View Academic Grade is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F401 | Version | 1.0 |
| Description | When a logged-in student selects "View Academic Grade," the system shall retrieve their academic results from the academic database. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F402 | Version | 1.0 |
| Description | When data is retrieved, the system shall display the grades in a tabular format, including subject name, subject code, grade, and semester. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F403 | Version | 1.0 |
| Description | When no academic grades are found, the system shall display the message: "No academic results available." | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC004 | | Version | 1.0 |
| Feature | F004 View Academic Grade | | | |
| Purpose | To allow students to view their academic grades for each subject and semester. | | | |
| Actor | Student | | | |
| Trigger | Student selects "View Academic Grade" from the student portal. | | | |
| Precondition | Student must be logged in. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Student selects "View Academic Grade" from the student portal. | | |
| 2 | System retrieves the academic results from the academic system. | | |
| 3 | System displays the results in tabular format including subject code, subject name, grade, and semester. | | |
| Alternate Flow – No academic results found | 3.1 | If no results are found, the system displays a message: "No academic results available." | | |
| Rules | Grades displayed must reflect the student’s official academic record. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F005 View Notification

The functional requirement for View Notification is as followed.

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| --- | --- | --- | --- |
| Requirement ID | REQ\_F501 | Version | 1.0 |
| Description | When a student accesses the notification panel, the system shall display all notifications. | | |
| Author | Yong Di Lun | | |

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| --- | --- | --- | --- |
| Requirement ID | REQ\_F502 | Version | 1.0 |
| Description | When a student accesses the notification panel, the system shall visually indicate which notifications are unread. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F503 | Version | 1.0 |
| Description | When a student views a notification, the system shall mark it as read. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F504 | Version | 1.0 |
| Description | When no notifications are available, the system shall display the message: "No new notifications." | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC005 | | Version | 1.0 |
| Feature | F005 View Notification | | | |
| Purpose | To enable student to receive, view, and track notifications sent by the system or other users. | | | |
| Actor | Student | | | |
| Trigger | Notification is sent to the lecturer by the system or another user. | | | |
| Precondition | Lecturer must be logged in to receive and view notifications. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Student opens the notification panel. | | |
| 2 | System displays a list of notifications with unread indicators. | | |
| 3 | Student clicks and views a notification. | | |
| 4 | System marks the notification as read. | | |
| Alternate Flow – No Notifications | 2.1 | If no notifications are present, system displays "No new notifications." | | |
| Rules | Notifications must be time-stamped, linked to their sender, and marked read upon viewing. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F006 Report System Issue

The functional requirement for Report System Issue is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F601 | Version | 1.0 |
| Description | When a logged-in student or lecturer selects "Report System Issue," the system shall present a form for reporting an issue. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F602 | Version | 1.0 |
| Description | When user is filling the form, the system shall allow the user to enter issue details including title, description, and optionally attach a screenshot. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F603 | Version | 1.0 |
| Description | When the from is submitted, the system shall save the issue report and notify the system administrator. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F604 | Version | 1.0 |
| Description | When the issue report is successfully submitted, the system shall display a confirmation message to the user. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F605 | Version | 1.0 |
| Description | When the user attempts to submit the form with missing required fields, the system shall prompt the user to complete the required information. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC006 | | Version | 1.0 |
| Feature | F006 Report System Issue | | | |
| Purpose | To allow students and lecturers to report any issues encountered in the system. | | | |
| Actor | Student, Lecturer | | | |
| Trigger | User selects "Report System Issue" from the portal. | | | |
| Precondition | User must be logged in. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | User selects "Report System Issue" from the portal. | | |
| 2 | System presents an issue reporting form. | | |
| 3 | User fills in the issue title, description, and optionally attaches a screenshot. | | |
| 4 | User submits the form. | | |
| 5 | System saves the report and notifies the system administrator. | | |
| 6 | System confirms successful submission to the user. | | |
| Alternate Flow – Incomplete Submission | 4.1 | If required fields are not filled, system prompts user to complete them. | | |
| Rules | All required fields must be filled before submission. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F007 Manage Grade

The functional requirement for Manage Grade is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F701 | Version | 1.0 |
| Description | When a logged-in lecturer selects "Manage Grade," the system shall retrieve the list of courses assigned to them. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F702 | Version | 1.0 |
| Description | When the lecturer selects a course, the system shall display a list of enrolled students and their grades. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F703 | Version | 1.0 |
| Description | When the lecturer updates or enters a grade, the system shall save the updated grade to the academic database. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F704 | Version | 1.0 |
| Description | When the grade is saved successfully, the system shall confirm the update to the lecturer. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F705 | Version | 1.0 |
| Description | When the lecturer attempts to save a grade without entering required fields, the system shall prompt for missing data. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC007 | | Version | 1.0 |
| Feature | F007 Manage Grade | | | |
| Purpose | To allow lecturers to manage student grades for their assigned courses. | | | |
| Actor | Lecturer | | | |
| Trigger | Lecturer selects "Manage Grade" from the portal. | | | |
| Precondition | Lecturer must be logged in. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Lecturer selects "Manage Grade" from the portal. | | |
| 2 | System retrieves and displays the list of courses assigned to the lecturer. | | |
| 3 | Lecturer selects a course. | | |
| 4 | System displays the enrolled students and their grades. | | |
| 5 | Lecturer enters or updates grades for students. | | |
| 6 | System saves the updated grades and confirms the update. | | |
| Alternate Flow – Incomplete Submission | 5.1 | If required fields are not filled, system prompts the lecturer to complete them. | | |
| Rules | Grades must be stored securely and should reflect updates immediately in the academic system. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F008 Manage Attendance

The functional requirement for Manage Attendance is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F801 | Version | 1.0 |
| Description | When a logged-in lecturer selects "Manage Attendance," the system shall retrieve the list of courses assigned to them. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F802 | Version | 1.0 |
| Description | When the lecturer selects a course, the system shall display the list of enrolled students and their current attendance records. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F803 | Version | 1.0 |
| Description | When the lecturer marks attendance for a session, the system shall save the updated attendance records. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F804 | Version | 1.0 |
| Description | When the attendance is saved successfully, the system shall display a confirmation message to the lecturer. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F805 | Version | 1.0 |
| Description | When the lecturer attempts to save attendance with missing or invalid inputs, the system shall prompt the user to correct the errors. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC008 | | Version | 1.0 |
| Feature | F008 Manage Attendance | | | |
| Purpose | To allow lecturers to record and manage student attendance for each class session. | | | |
| Actor | Lecturer | | | |
| Trigger | Lecturer selects "Manage Attendance" from the portal. | | | |
| Precondition | Lecturer must be logged in. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Lecturer selects "Manage Attendance" from the portal. | | |
| 2 | System retrieves and displays the list of courses assigned to the lecturer. | | |
| 3 | Lecturer selects a course. | | |
| 4 | System displays the enrolled students and their attendance records. | | |
| 5 | Lecturer marks attendance for the selected session. | | |
| 6 | System saves the attendance and displays a confirmation message. | | |
| Alternate Flow – Invalid Input | 5.1 | If input is incomplete or invalid, the system prompts the lecturer to correct the entries. | | |
| Rules | Grades must be stored securely and should reflect updates immediately in the academic system. | | | |
| Author | Yong Di Lun | | | |

### F009 View Student Progress

The functional requirement for View Student Progress is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F901 | Version | 1.0 |
| Description | When a logged-in lecturer selects "View Student Progress," the system shall allow them to search or select a student from their enrolled list. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F902 | Version | 1.0 |
| Description | When a student is selected, the system shall retrieve their academic performance data including grades, attendance, and assignment status. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F903 | Version | 1.0 |
| Description | When student progress data is retrieved, the system shall present it in a clear tabular or graphical summary. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F904 | Version | 1.0 |
| Description | When no progress data is available for the selected student, the system shall display a message: "No academic progress data available." | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F905 | Version | 1.0 |
| Description | When data is displayed, the system shall ensure it reflects the most recent academic records. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC009 | | Version | 1.0 |
| Feature | F009 View Student Progress | | | |
| Purpose | To allow lecturers to monitor and review the academic progress of their students. | | | |
| Actor | Lecturer | | | |
| Trigger | Lecturer selects "View Student Progress" from the portal menu. | | | |
| Precondition | Lecturer must be logged in and assigned to at least one student. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Lecturer selects "View Student Progress" from the system. | | |
| 2 | System displays a list or search bar for student selection. | | |
| 3 | Lecturer selects a student. | | |
| 4 | System retrieves and displays the student's academic records in tabular or graphical form. | | |
| Alternate Flow – No Data Found | 4.1 | If no data is available, system displays "No academic progress data available." | | |
| Rules | Progress data must be retrieved securely, updated in real time, and visible only to authorized lecturers. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F010 View At-Risk Student Alert

The functional requirement for Receive At-Risk Student Alerts is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1001 | Version | 1.0 |
| Description | When a student meets predefined risk conditions (e.g., low attendance, poor grades), the system shall automatically generate an alert. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1002 | Version | 1.0 |
| Description | When an alert is generated, the system shall deliver it to the responsible lecturer’s notification panel or inbox. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1003 | Version | 1.0 |
| Description | When the lecturer views the alert, the system shall mark it as acknowledged. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1004 | Version | 1.0 |
| Description | When no at-risk conditions are present, the system shall not generate or display alerts. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1005 | Version | 1.0 |
| Description | When multiple alerts are triggered, the system shall prioritize them based on severity or timestamp. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC010 | | Version | 1.0 |
| Feature | F010 View At-Risk Student Alerts | | | |
| Purpose | To notify lecturers when a student is identified as at risk based on academic performance or attendance. | | | |
| Actor | Lecturer | | | |
| Trigger | System detects a student at risk based on predefined conditions. | | | |
| Precondition | Lecturer must be logged in and assigned to the student. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Lecturer selects "At-Risk Alerts" from the dashboard. | | |
| 2 | Lecturer views list of at-risk alerts including reasons (e.g., poor grades, low attendance). | | |
| Alternate Flow – No Risk Triggered | 2.1 | If no alerts are available for the assigned students, the system displays: **"No at-risk alerts available at this time."** | | |
| Rules | Alerts must be generated based on real-time academic and attendance data and delivered only to assigned lecturers. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F011 Manage Notification

The functional requirement for Manage Notification is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1101 | Version | 1.0 |
| Description | When a logged-in lecturer or administrator selects "Manage Notification," the system shall provide a form to define the notification content, conditions, and schedule. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1102 | Version | 1.0 |
| Description | When defining a notification, the system shall allow selection of recipients including students, parents, or both. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1103 | Version | 1.0 |
| Description | When the lecturer marks attendance for a session, the system shall save the updated attendance records. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1104 | Version | 1.0 |
| Description | When the attendance is saved successfully, the system shall display a confirmation message to the lecturer. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1105 | Version | 1.0 |
| Description | When the lecturer attempts to save attendance with missing or invalid inputs, the system shall prompt the user to correct the errors. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC011 | | Version | 1.0 |
| Feature | F011 Manage Attendance | | | |
| Purpose | To allow lecturers to record and manage student attendance for each class session. | | | |
| Actor | Lecturer | | | |
| Trigger | Lecturer selects "Manage Attendance" from the portal. | | | |
| Precondition | Lecturer must be logged in. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Lecturer selects "Manage Attendance" from the portal. | | |
| 2 | System retrieves and displays the list of courses assigned to the lecturer. | | |
| 3 | Lecturer selects a course. | | |
| 4 | System displays the enrolled students and their attendance records. | | |
| 5 | Lecturer marks attendance for the selected session. | | |
| 6 | System saves the attendance and displays a confirmation message. | | |
| Alternate Flow – Invalid Input | 5.1 | If input is incomplete or invalid, the system prompts the lecturer to correct the entries. | | |
| Rules | Grades must be stored securely and should reflect updates immediately in the academic system. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F012 View System Issue

The functional requirement for View System Issue is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1201 | Version | 1.0 |
| Description | When an admin selects "View System Issue," the system shall display a list of available system reports. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1202 | Version | 1.0 |
| Description | When a report is selected, the system shall retrieve and display the report data accurately. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1203 | Version | 1.0 |
| Description | When viewing a report, the system shall allow export options such as PDF or Excel. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1204 | Version | 1.0 |
| Description | When no reports are available, the system shall display: "No reports available at this time." | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1205 | Version | 1.0 |
| Description | When multiple reports are available, the system shall allow sorting or filtering by type, date, or category. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC012 | | Version | 1.0 |
| Feature | F012 View System Issue | | | |
| Purpose | To enable administrators to view and analyze system reports for monitoring and decision-making. | | | |
| Actor | Admin | | | |
| Trigger | Admin selects "View System Issue" from the administrative portal. | | | |
| Precondition | Admin must be logged in and authorized to View System Issues. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Admin selects "View System Issue" from the system dashboard. | | |
| 2 | System displays a list of available reports. | | |
| 3 | Admin selects a report to view. | | |
| 4 | System retrieves and displays the report data. | | |
| Alternate Flow – No Reports Found | 2.1 | If no reports are available, the system shows "No reports available at this time." | | |
| Rules | Report access must be role-based and updated to reflect the latest system data. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F013 Monitor System Access Log

The functional requirement for Monitor System Access Log is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1301 | Version | 1.0 |
| Description | When an admin selects "Monitor System Access Log," the system shall display a chronological list of all user access records. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1302 | Version | 1.0 |
| Description | When viewing access logs, the system shall include user ID, access time, IP address, and activity description. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1303 | Version | 1.0 |
| Description | When the admin applies filters, the system shall display filtered access records based on selected criteria. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1304 | Version | 1.0 |
| Description | When no logs match the filter criteria, the system shall display: "No access records found." | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1305 | Version | 1.0 |
| Description | When access logs are displayed, the system shall allow export to formats like CSV or PDF. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC013 | | Version | 1.0 |
| Feature | F013 Monitor System Access Log | | | |
| Purpose | To enable administrators to track and audit user access activity for system security and accountability. | | | |
| Actor | Admin | | | |
| Trigger | Admin selects "Monitor System Access Log" from the administrative interface. | | | |
| Precondition | Admin must be logged in and authorized to access system logs. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Admin navigates to the "Monitor System Access Log" section. | | |
| 2 | System retrieves and displays access logs in chronological order. | | |
| 3 | Admin applies optional filters (e.g., user, date, IP address). | | |
| 4 | System displays the filtered results. | | |
| Alternate Flow – No Logs Match Filter | 4.1 | System displays: "No access records found." | | |
| Rules | Access logs must be immutable and secured against unauthorized modifications. Only authorized admins may access them. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F014 Generate Fee Reports

The functional requirement for Generate Fee Report is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1401 | Version | 1.0 |
| Description | When an admin selects "Generate Fee Reports," the system shall prompt for criteria such as term, department, or student level. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1402 | Version | 1.0 |
| Description | When criteria are submitted, the system shall generate a detailed fee report including student name, ID, amount paid, and outstanding fees. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1403 | Version | 1.0 |
| Description | When a report is generated, the system shall allow exporting to PDF, Excel, or printing. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1404 | Version | 1.0 |
| Description | When no data matches the selected criteria, the system shall display: "No fee records available for the selected criteria." | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC014 | | Version | 1.0 |
| Feature | F014 Generate Fee Reports | | | |
| Purpose | To enable administrators to generate comprehensive reports on student fee payments and outstanding balances. | | | |
| Actor | Admin | | | |
| Trigger | Admin selects "Generate Fee Reports" from the financial management section. | | | |
| Precondition | Admin must be logged in and authorized to access financial reports. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Admin selects "Generate Fee Reports". | | |
| 2 | System prompts for selection criteria (e.g., term, department). | | |
| 3 | Admin enters criteria and confirms. | | |
| 4 | System processes and displays the report. | | |
| Alternate Flow – No Data Found | 4.1.1 | System displays: "No fee records available for the selected criteria." | | |
| Alternate Flow – Export or Print Report | 4.2.1 | Admin selects "Export" or "Print" option from the report view. | | |
| 4.2,2 | System generates a downloadable/exportable file or sends the report to the printer. | | |
| Rules | Fee data must reflect the latest financial transactions and be accessible only to authorized users. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F015 View Enrollment Statistic

The functional requirement for View Enrollment Statistic is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1501 | Version | 1.0 |
| Description | When an admin selects "View Enrollment Statistic," the system shall prompt for filters such as term, program, and department. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1502 | Version | 1.0 |
| Description | When filters are applied, the system shall generate statistical data showing student enrollment counts by category. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1503 | Version | 1.0 |
| Description | When enrollment data is displayed, the system shall present it in table and/or graphical formats such as bar charts or pie charts. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1504 | Version | 1.0 |
| Description | When no data matches the filters, the system shall display: "No enrollment data available for the selected criteria." | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC015 | | Version | 1.0 |
| Feature | F015 View Enrollment Statistics | | | |
| Purpose | To enable administrators to access and review statistical data about student enrollment by department, program, or academic term. | | | |
| Actor | Admin | | | |
| Trigger | Admin selects "View Enrollment Statistics" from the admin dashboard. | | | |
| Precondition | Admin must be logged in and have access privileges to view academic statistics. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Admin selects "View Enrollment Statistic". | | |
| 2 | System prompts admin to enter or select filters (e.g., term, department). | | |
| 3 | Admin applies filters and submits. | | |
| 4 | System processes request and generates enrollment statistics. | | |
| 5 | System displays results in tabular and graphical formats. | | |
| Alternate Flow – No Data Found | 4.1 | System displays: "No enrollment data available for the selected criteria." | | |
| Rules | Enrollment data must reflect the most current records and be restricted to authorized personnel. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F016 View Advanced Analytics Dashboard

The functional requirement for View Advanced Analytics Dashboard is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1601 | Version | 1.0 |
| Description | When an admin accesses the Advanced Analytics Dashboard, the system shall retrieve and display data visualizations and insights. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1602 | Version | 1.0 |
| Description | When filters such as department, date range, or performance indicators are applied, the dashboard shall update accordingly. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1603 | Version | 1.0 |
| Description | When the dashboard is loaded, the system shall provide drill-down capabilities and data export options. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1604 | Version | 1.0 |
| Description | When no relevant data is found, the system shall display: "No analytics data available for the selected criteria." | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC016 | | Version | 1.0 |
| Feature | F016 View Advanced Analytics Dashboard | | | |
| Purpose | To enable administrators to view advanced insights and analytical data regarding system and academic metrics. | | | |
| Actor | Admin | | | |
| Trigger | Admin selects "Advanced Analytics Dashboard" from the reporting section. | | | |
| Precondition | Admin must be logged in with appropriate access rights. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | Admin selects "Advanced Analytics Dashboard". | | |
| 2 | System retrieves and displays analytics data. | | |
| 3 | Admin views insights | | |
| Alternate Flow – No Data Found | 2.1 | System displays: "No analytics data available for the selected criteria." | | |
| Alternate Flow – Apply Filters | 3.1 | Admin applies filters such as department or time range. | | |
| 3.2 | System updates visualizations accordingly. | | |
| Rules | Analytics data must be current, accurate, and accessible only to authorized users. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F017 Send SMS Notification

The functional requirement for Send SMS Notification is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1701 | Version | 1.0 |
| Description | When the system triggers an SMS notification, the SMS Gateway shall format and send the message to the designated recipients. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1702 | Version | 1.0 |
| Description | When a message is successfully sent, the SMS Gateway shall return a delivery confirmation to the system. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1703 | Version | 1.0 |
| Description | When message sending fails, the SMS Gateway shall notify the system with an error message including a failure reason. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1704 | Version | 1.0 |
| Description | When SMS content exceeds the character limit, the SMS Gateway shall segment the message appropriately. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC017 | | Version | 1.0 |
| Feature | F017 Send SMS Notifications | | | |
| Purpose | To enable the system to send timely SMS notifications to students, parents, or staff through the SMS Gateway. | | | |
| Actor | System (via SMS Gateway) | | | |
| Trigger | System identifies a condition that requires sending an SMS notification. | | | |
| Precondition | SMS Gateway must be available and properly configured. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | System detects a condition to send SMS notification. | | |
| 2 | System formats message and sends request to SMS Gateway. | | |
| 3 | SMS Gateway sends SMS to recipients. | | |
| 4 | SMS Gateway returns delivery confirmation to system. | | |
| Alternate Flow – Message Too Long | 2.1 | SMS Gateway segments message into multiple SMS parts before sending. | | |
| Alternate Flow – Send Failure | 3.1 | System logs errors with reason. | | |
| Rules | Message delivery must comply with SMS character limits, gateway reliability, and local telecommunications regulations. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

### F018 Sync Academic and Billing Data

The functional requirement for Sync Academic and Billing Data is as followed.

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1801 | Version | 1.0 |
| Description | When academic and billing data changes, the system shall initiate synchronization of relevant academic and billing data. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1802 | Version | 1.0 |
| Description | When academic and billing data is updated, the Campus Management System shall transmit updated information to the Campus Management System or the Campus Communication System. | | |
| Author | Yong Di Lun | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Requirement ID | REQ\_F1803 | Version | 1.0 |
| Description | When synchronization fails, the system shall log the error and alert the system administrator with appropriate failure details. | | |
| Author | Yong Di Lun | | |

The following table shows the detail of this feature, followed by a activity diagram to show activity flow for the feature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Use Case ID | UC018 | | Version | 1.0 |
| Feature | F018 Sync Academic and Billing Data | | | |
| Purpose | To ensure academic data is kept in sync with billing records to support accurate student billing. | | | |
| Actor | System (via Campus Management System) | | | |
| Trigger | A change is detected in either the Campus Communication System or the Campus Management System involving academic or billing-related data (e.g., course registration, enrollment updates, or billing adjustments). | | | |
| Precondition | The Campus Communication System, the Campus Management System, and the Billing System must be connected and accessible with synchronization protocols in place. | | | |
| Scenario Name | Step | Action | | |
| Main Flow | 1 | A data change occurs in either the Campus Management System or the Campus Communication System. | | |
| 2 | The system where the change occurred detects the modification. | | |
| 3 | The initiating system prepares and transmits the updated data to the other system | | |
| 4 | The receiving system validates the data and applies updates to maintain consistency. | | |
| Alternate Flow – Synchronization Failure | 4.1 | If data synchronization fails at any point, the receiving system logs the error and alerts the administrator. | | |
| 4.2 | Optionally, the system retries synchronization based on predefined retry logic or scheduled intervals. | | |
| Rules | Data synchronization must ensure consistency, integrity, and be traceable for audit purposes. | | | |
| Author | Yong Di Lun | | | |

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| PlantUML Diagram |

## Performance Requirements

## Usability Requirements

## Interface Requirements

### System Interfaces

This section outlines the key system interfaces that enable communication between the University Communication and Services Portal and external systems. Each interface supports specific operational requirements, ensuring smooth data exchange, secure communication, and reliable service delivery. The table described below include connections to messaging services and the institution’s Campus Management System (CMS), both essential for effective academic and administrative operations.

|  |  |  |
| --- | --- | --- |
| Interface Name | Functionality | System Requirements |
| SMS Gateway Interface | Sends SMS notifications to students and parents. | - Integration with an external SMS service (e.g., REST API). - Authentication mechanism (e.g., API token). - Event-triggered notification system (e.g., grade update, attendance). - Message formatting logic. - Status tracking (success, failure). - Secure HTTPS communication. |
| Campus Management System (CMS) Interface | Shares academic and administrative data between the portal and CMS. | - Access to CMS data endpoints via API or database connection. - Read/write permissions for student data, attendance, and grades. - Data mapping schema for consistent formats. - Secure user authentication for data transactions. - Capability for both real-time data pull and scheduled sync. - Error handling and logging for data operations. |

### User Interfaces

This section outlines the logical characteristics and requirements for each user interface associated with the university's software product. Interfaces are organized by user roles—Student, Lecturer, and Administrator—and include detailed functionality and system behavior expectations. This structured approach ensures a consistent, accessible, and user-centered design that adheres to the university's standards. The table described below includes these characteristics and requirements in a structured format.

|  |  |  |  |
| --- | --- | --- | --- |
| User Role | Interface Name | Logical Characteristics | Requirements |
| Student | Student Dashboard | - Summary of academic info (GPA, recent grades, attendance) - Announcements and important dates - Quick access to schedule and notifications | Must integrate real-time academic data API, support university branding, and push urgent notifications. |
| Student | Class Schedule Viewer | - Weekly/monthly calendar view of enrolled classes - Color-coded based on subject or type - Mobile-responsive design | Interactive calendar with responsive UI, allow filtering by course and term, use consistent color legend. |
| Student | Grades Viewer | - Subject-wise grade breakdown - Real-time updates after lecturers submit grades - Graphical trend of performance | Enable secure access to grade data, refresh data dynamically, and include interactive performance graphs. |
| Student | Notification Center | - List of recent messages (system, lecturer, admin) - Filter by category - Dismiss or archive messages | Message filtering functionality, dismiss/archive logic, and category tagging for efficient viewing. |
| Student, Lecturer | Report Issue Form | - Text input and category dropdown - Optional file attachment - Confirmation and tracking of submitted issues | Form validation, secure file upload, confirmation message, and tracking via unique ticket ID. |
| Lecturer | Lecturer Dashboard | - Overview of assigned classes - Summary of grading and attendance status - Alerts for pending submissions or deadlines | Dashboard widgets with data pull from course modules, alert system for pending actions. |
| Lecturer | Grade Submission Form | - Input fields for marks - Batch upload option - Auto-calculation and save progress feature | Support CSV/Excel upload, auto-save in local storage, and input validation for grade entries. |
| Lecturer | Attendance Management Panel | - List of enrolled students with checkboxes - Filter by session/date - Submit and edit attendance records | Student list should be auto populated per class, date filter required, editable record submission. |
| Lecturer | Performance Analytics View | - Charts showing class average, individual trends - Alerts for underperforming students - Export options (PDF, Excel) | Analytics must update after grade changes, support PDF/Excel exports, and notify on underperformance. |
| Lecturer | Notification Management Tool | - Compose messages for students or parents - Select target audience by role, class, program, or individuals - Supports immediate, scheduled, or condition-based delivery - Predefined message templates - Track message delivery and view confirmation status | Custom messaging UI, delivery scheduler, condition logic engine, template library, and delivery receipts. |
| Administrator | Admin Dashboard | - High-level system metrics (user count, system logs) - Quick actions (role assignment, report generation) | Must display KPIs with refresh option, and include quick access buttons for admin tasks. |
| Administrator | User & Role Management | - Add/edit/delete users - Assign user roles - View access logs | Access control for roles, audit log visibility, and user creation with validation rules. |
| Administrator | Report & Analytics Module | - Generate fee, enrollment, and academic reports - Filter by semester, faculty, or program - Export and print reports | Support complex filters, generate reports on-demand, and export in multiple formats (PDF, XLSX). |
| Administrator | System Logs Viewer | - View and filter activity logs - Searchable by user ID, action type, or date | Log viewer with search, filter by metadata, and data integrity assurance. |

### Hardware Interfaces

This section outlines the logical characteristics of hardware interfaces used by the University Communication and Services Portal. It details the types of supported devices, required configurations, and communication protocols. The table below summarizes each hardware interface, highlighting its purpose, compatibility requirements, and key operational details.

|  |  |
| --- | --- |
| Interface Name | Description |
| Web Client Devices | - Supports user access via standard computing devices such as desktops, laptops, tablets, and smartphones. - Requires a device with modern web browser support (HTML5, CSS3, JavaScript). - No special installation or drivers required. - Supports responsive design for optimal display across screen sizes. |
| Server Hosting Environment | - Runs on institution-provided servers or cloud-hosted virtual machines. - Requires minimum hardware spec: Quad-core CPU, 8 GB RAM, SSD storage. - Operates under virtualized environments (e.g., VMware, Hyper-V). - Compatible with Linux or Windows Server OS. - Network ports: HTTPS (443), HTTP (80), and SMTP (for outbound notifications). |

### Software Interfaces

This section describes all software products required to operate the University Communication and Services Portal, including operating systems, libraries, integrated systems (like CMS), and external platforms (e.g., SMS Gateway). For each interface, a brief technical linkage explanation is provided. The table below lists each required software product along with its technical specifications, purpose within the portal ecosystem, and requirements.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Software Name | Mnemonic | Specification No. | Version | Source | Purpose of Interface | Requirement |
| Campus Management System | CMS | CMS-SPEC-001 | v3.x (current) | In-house / University IT Dept | Core academic records system. The portal integrates to retrieve subjects, schedules, and grades. | API token, JSON support, network access to CMS endpoint |
| SMS Gateway | SMSGW | SMS-SPEC-002 | Latest supported | Third-party Provider | Enables delivery of transactional SMS alerts (e.g., attendance, billing) to students and guardians. | API key, message schema compliance, outbound HTTPS connectivity |
| Operating System | OS | OS-SPEC-001 | Windows Server / Ubuntu 22.04 | Microsoft / Canonical | Provides the runtime environment for hosting portal components and services. | Web server configuration, OS-level permissions, firewall and network settings |
| Web Server | WEB-SRV | WS-SPEC-001 | Apache 2.4 / Nginx 1.18+ | Open Source | Hosts the front-end and backend API services with support for HTTPS and load balancing. | SSL certificates, virtual host configs, access to ports 80/443, logging enabled |
| Database Management System | DBMS | DB-SPEC-002 | PostgreSQL 14+ | Open Source / On-premises | Stores user data, grades, class schedules, notifications, and audit logs. | Database user credentials, connection string, ORM mappings, backup strategy |
| Authentication Service (SSO) | SSO | AUTH-SPEC-003 | OAuth 2.0 / OpenID Connect | University Identity Server | Provides Single Sign-On using institutional credentials for all users. | Client ID/secret, redirect URI, token endpoint access, JWT validation logic |

### Communication Interfaces

**This section provides a comprehensive overview of the communication interfaces utilized by the University Communication and Services Portal.** These interfaces encompass both internal and external channels required for user interactions, system interoperability, and service message delivery. The table below details the specific communication methods, protocols, and configuration requirements associated with each system component.

|  |  |
| --- | --- |
| Interface Name | Requirement |
| Client–Server Communication | - HTTPS (HTTP over TLS) used for secure browser communication. - RESTful API endpoints consumed by client UI. - All communication encrypted using TLS 1.2+. |
| Server–CMS Communication | - Internal network access via secured API calls. - Communication within university LAN or over VPN tunnel. - JSON payload over HTTP. |
| Server–SMS Gateway Communication | - Outbound API calls to external SMS provider (e.g., Twilio, Nexmo). - HTTPS REST API with authentication token. - Retry mechanisms for failed delivery. |

### External Interfaces

## Logical Database Requirements

## Design Constraints

## Software System Attributes

## Supporting Information

# Verification

## Verification Approach

## Verification Criteria

# Appendices

## Assumptions and Dependencies

## Acronyms and Abbreviations

## Glossary