Software Requirements Specification

For

UniComm

Group No.: 5 (TT4L)

ANGEL PHOON AN GEE	**S-1231302078**
MUHAMMAD NABIL NAUFAL BIN MD ZAID	**S-1221101160**
WAYMAN TAN	**S-1211111046**
YONG DI LUN	**S-1211110326**

Date: **21 May 2025**

Contents

1 Introduction

Nowadays, effective communication and streamlined access to information are crucial for institutional success. Hence, the UniComm 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.

1.1 Purpose

The purpose of the UniComm 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.

1.2 Scope

The UniComm 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.

1.3 Product Overview

The UniComm 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.

1.3.1 Product Perspective

The UniComm 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.

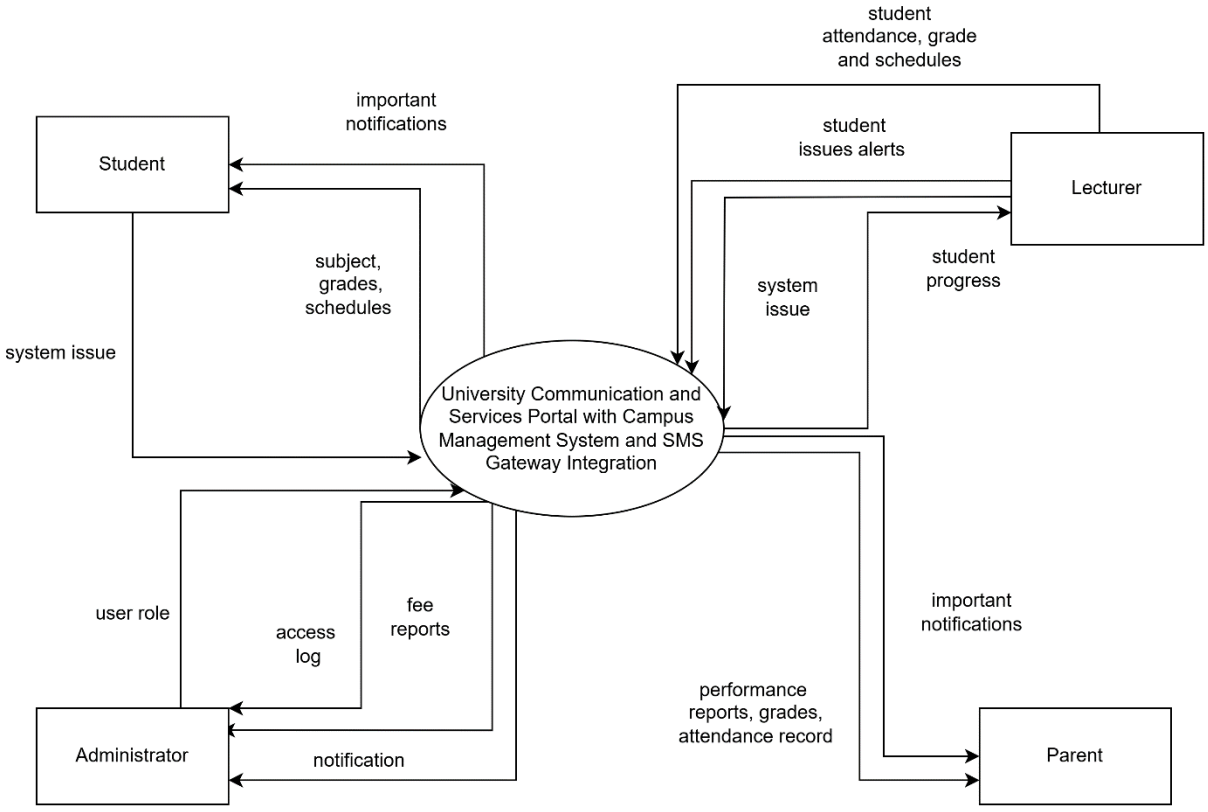

Figure 1
Context diagram of UniComm Portal with Campus Management System and SMS Gateway Integration

1.3.1.1 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.

1.3.1.2 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.

1.3.1.3 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

1.3.1.4 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.

1.3.2 Product Functions

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

Table 1 *Product 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	View 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

1.3.3 User Characteristics

The UniComm 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.

Table 2 *User roles and characteristics of UniComm system*

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.

1.3.4 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.

1.4 Definitions

Table 3 *Terms and definitions*

Term	Definition
Portal	The web-based UniComm platform.
Dashboard	The interface shows key information and actions for each user.
Notification	A message generated by the system or admin, sent to users through the portal or SMS.

Attendance	Records indicating a student's presence or absence in scheduled classes.
Academic Record	Student data related to grades, subjects, and course progress.
SMS Gateway	A third-party service responsible for sending SMS notifications to users.
User Role (Role-Based Access)	A system feature that grants permissions based on a user's role (e.g., student, lecturer, admin).
System Issue Report	A form submitted by users to notify administrators of technical problems.
Admin Panel	Administrative interface used for managing users, settings, reports, and notifications.

2 References

The document is prepared in reference to the following documents:

i. IEEE Std 830-1998, Recommended Practice for Software Requirements Specifications

ii. SMS. https://aws.amazon.com/what-is/sms/

3 Specific Requirements

3.1 Functions

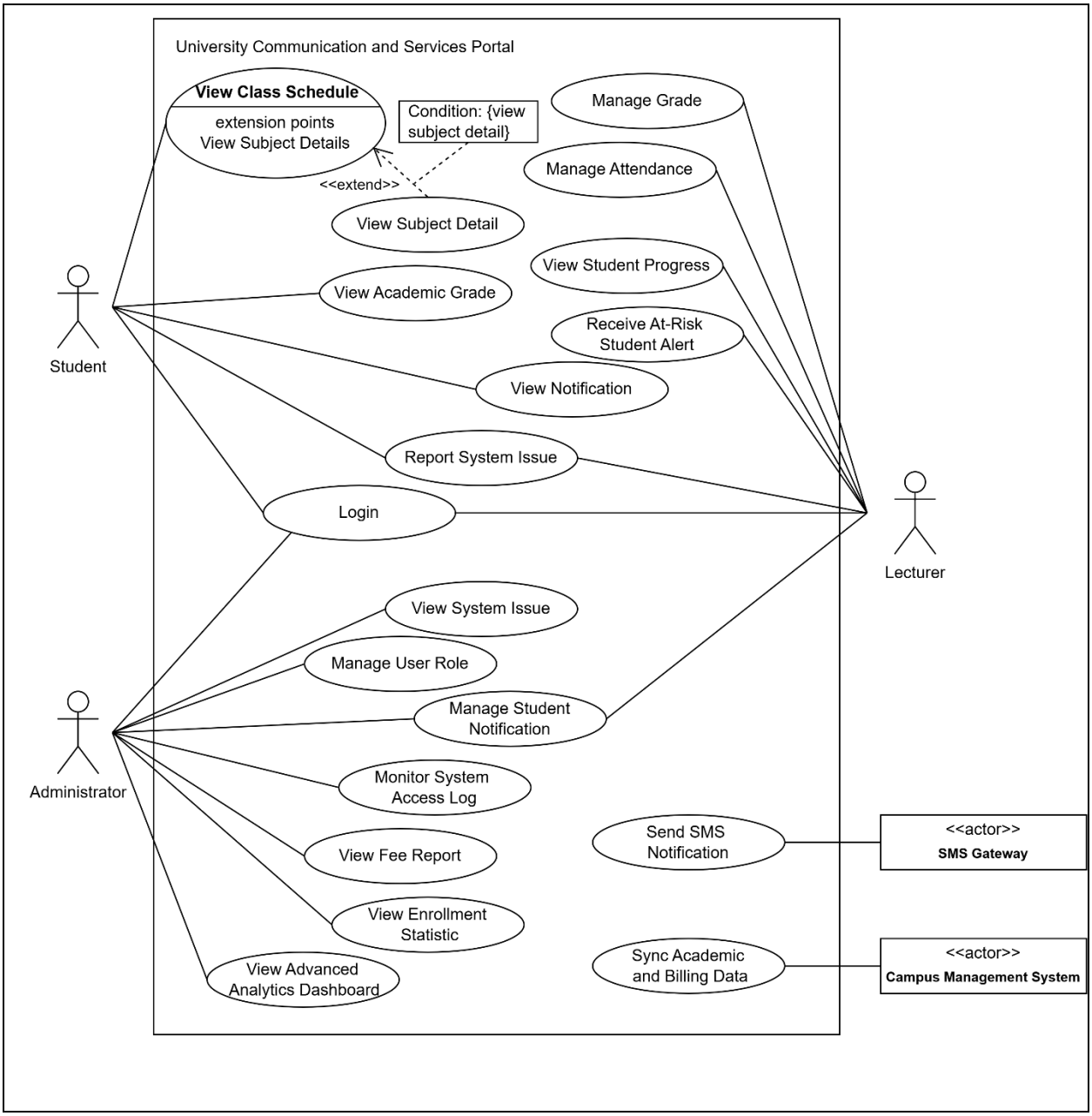

Figure 2
Use Case Diagram of UniComm system

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		

3.1.1 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

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

Table 4
Use case table for F001 Login

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	If credentials are invalid, system displays an error message.	
Rules	Username and password must match a registered user record.		
Author	Yong Di Lun		

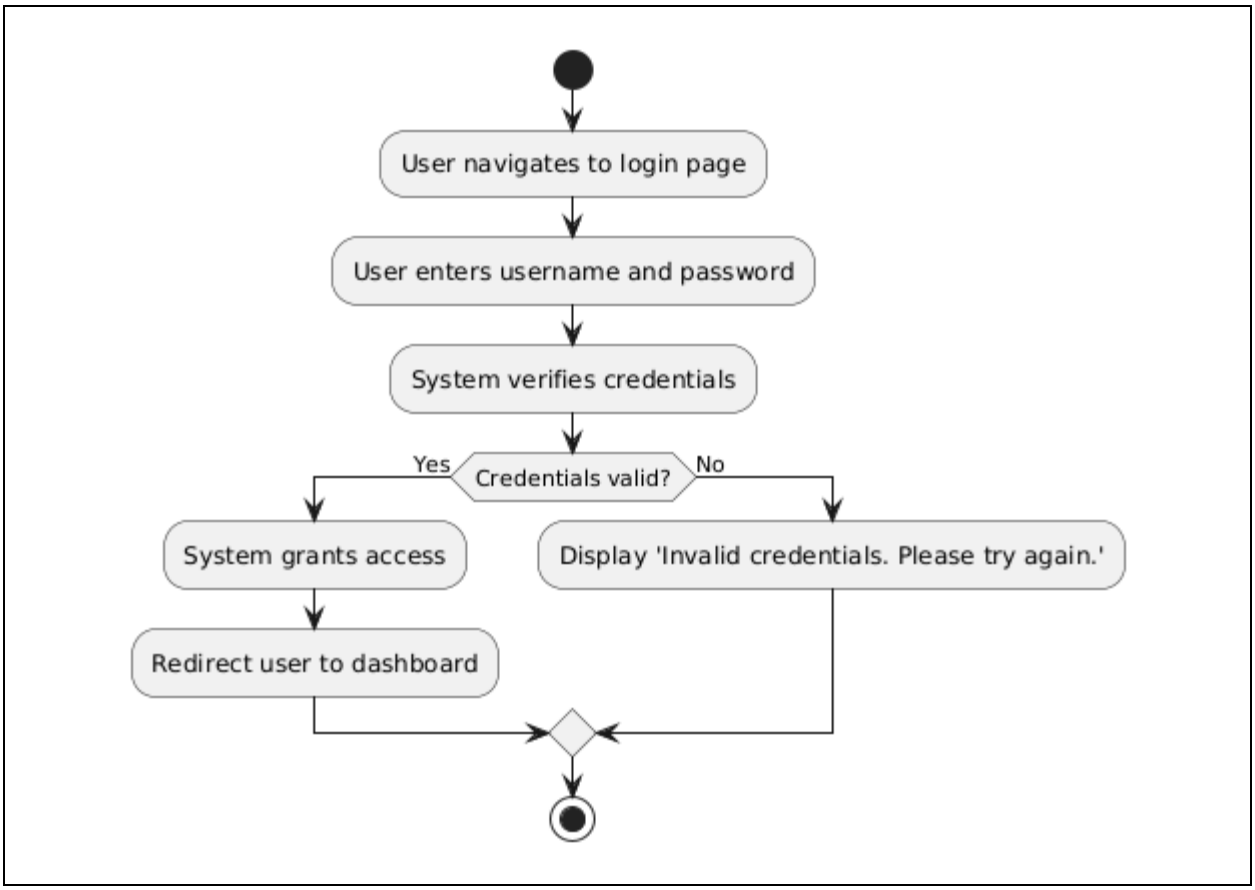

Figure 3
Activity diagram for F001 Login

3.1.2 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

Table 5
Use case table for F002 View Class Schedule

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		

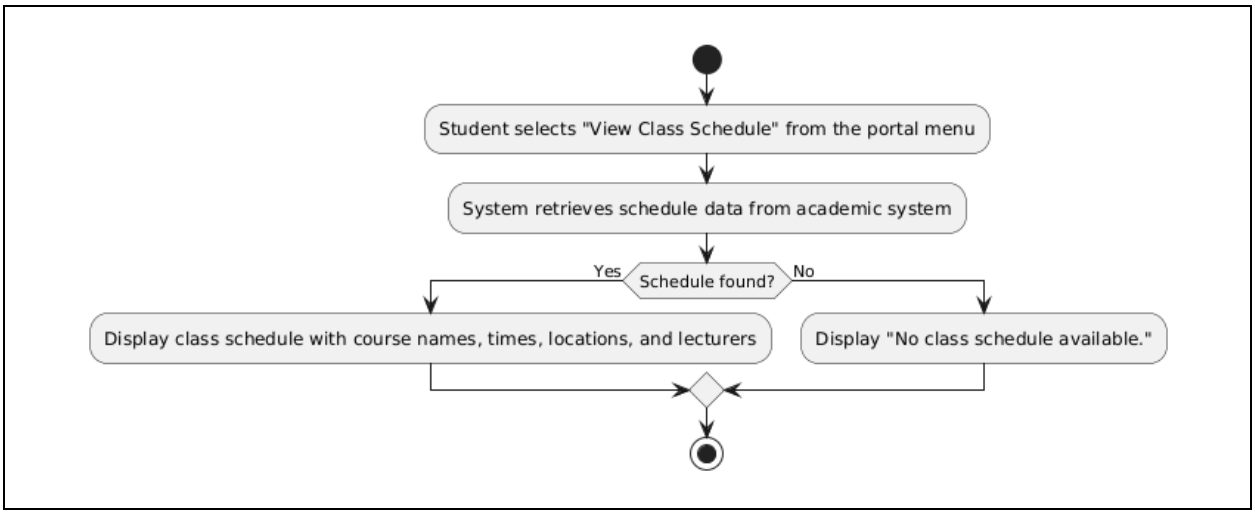

Figure 4
Activity diagram for F002 View Class Schedule

3.1.3 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

Table 6
Use case table for F003 View Subject Detail

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		

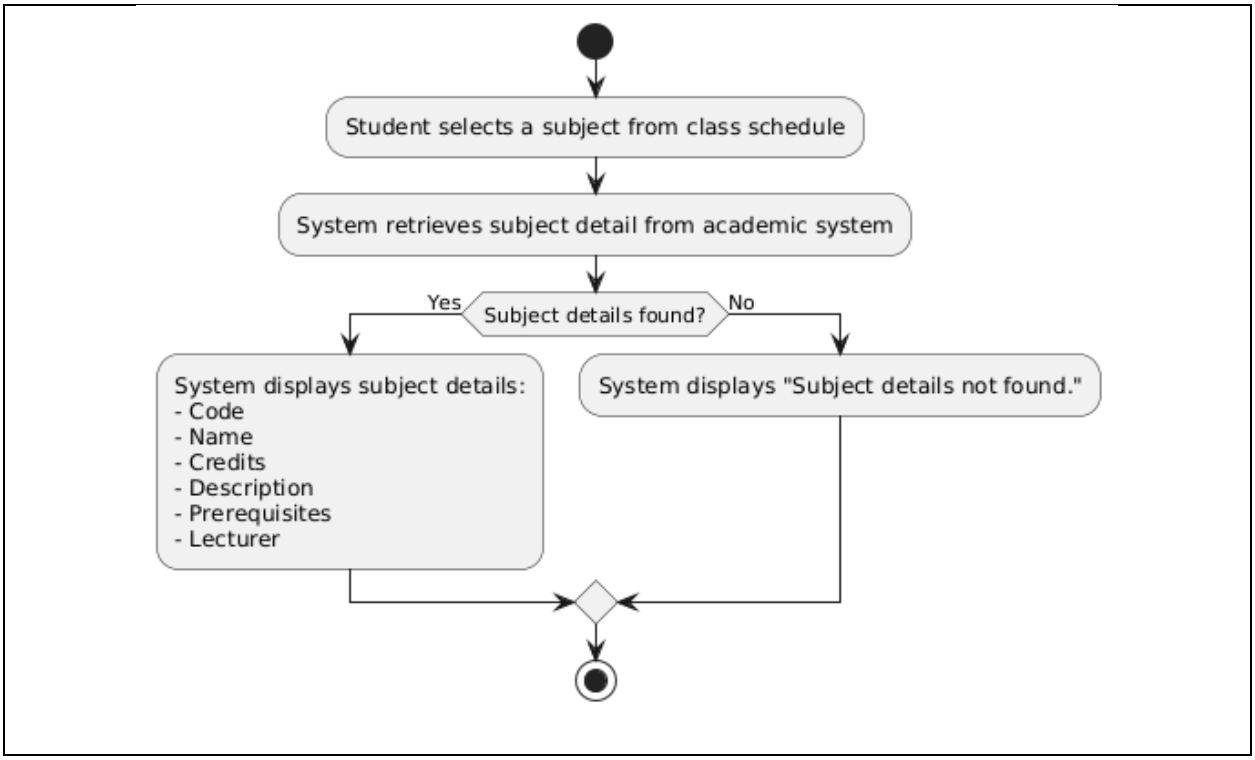

Figure 5
Activity diagram for F003 View Subject Detail

3.1.4 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

Table 7
Use case table for F004 View Academic Grade

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	

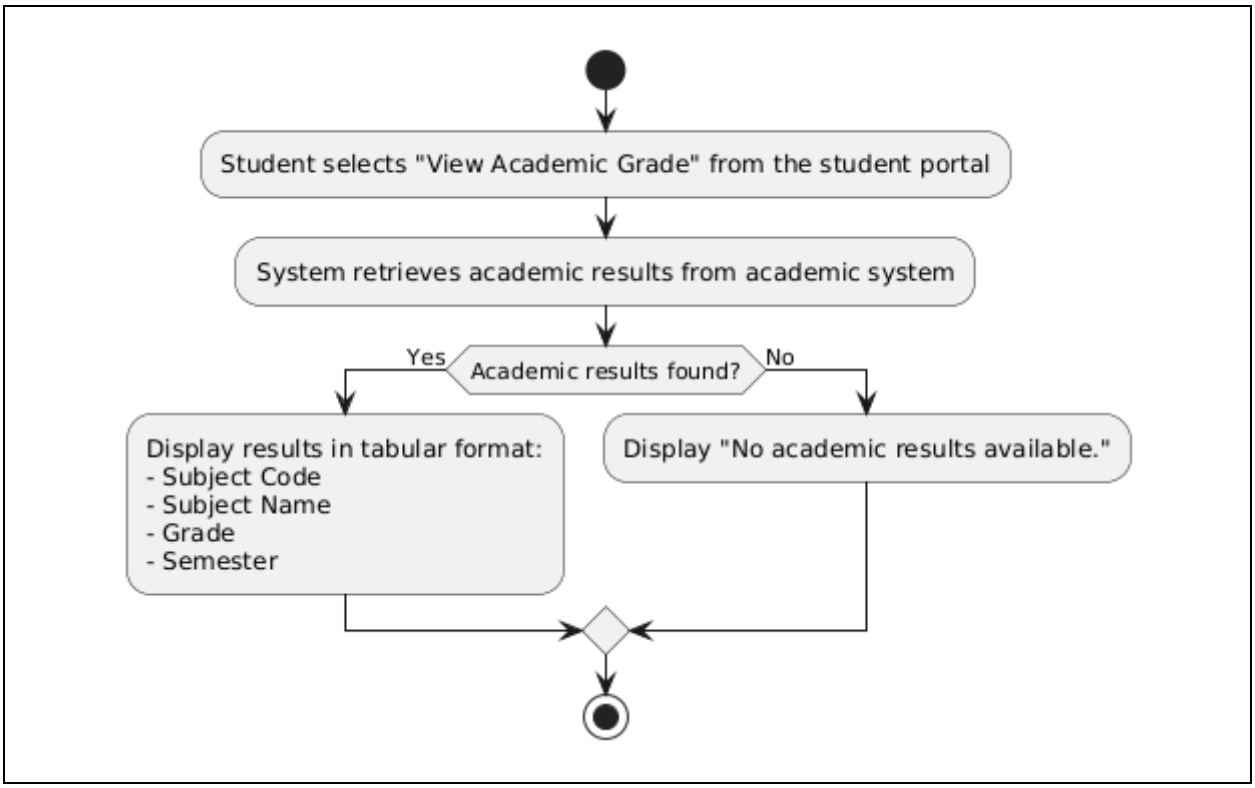

Figure 6
Activity diagram for F004 View Academic Grade

3.1.5 F005 View Notification

The functional requirement for View Notification is as followed.

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		

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

Table 8
Use case table for F005 View Notification

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			

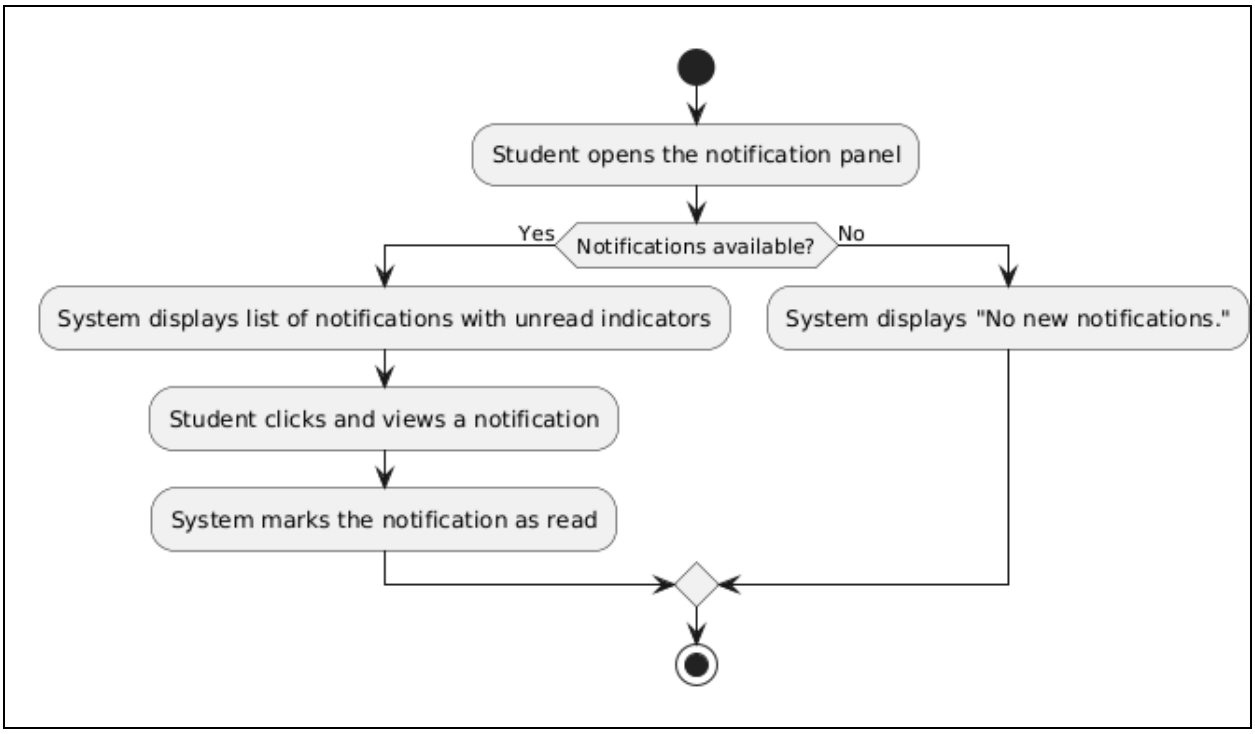

Figure 7
Activity diagram for F005 View Notification

3.1.6 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

Table 9
Use case table for F006 Report System Issue

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		

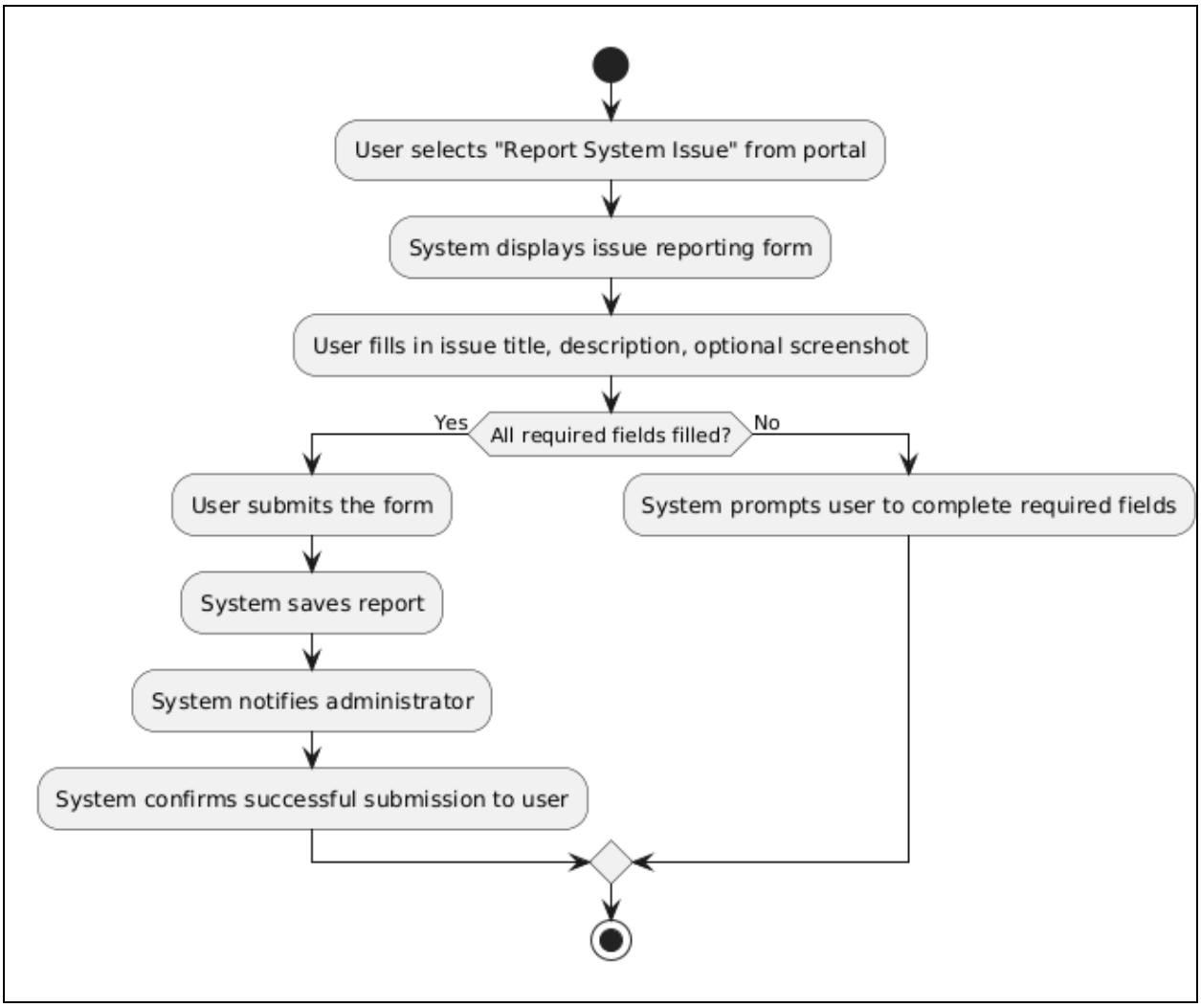

Figure 8
Activity diagram for F006 Report System Issue

3.1.7 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

Table 10
Use case table for F007 Manage Grade

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		

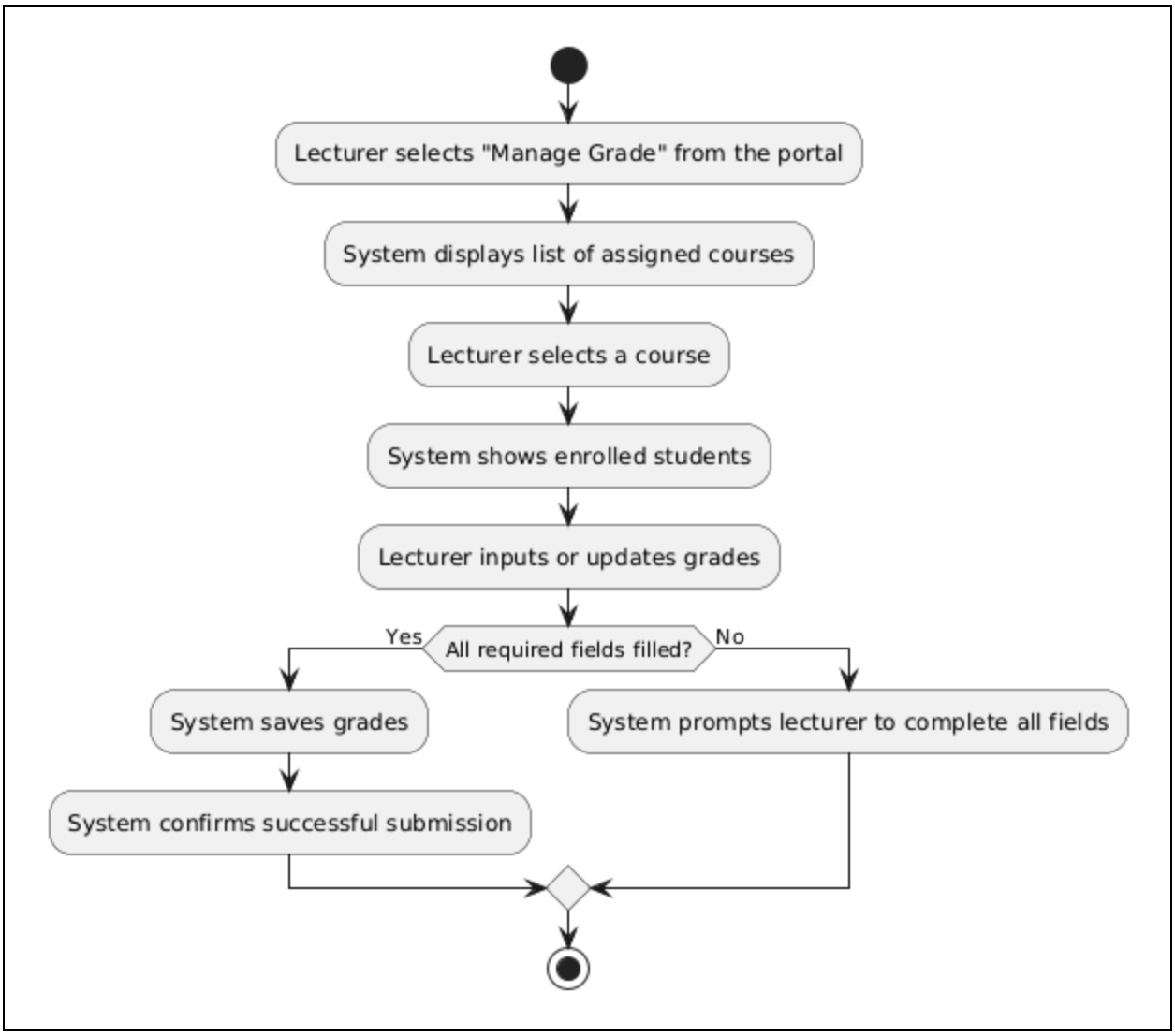

Figure 9
Activity diagram for F007 Manage Grade

3.1.8 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

Table 11
Use case table for F008 Manage Attendance

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	Attendance must be stored securely and should reflect updates immediately in the academic system.	
Author	Yong Di Lun	

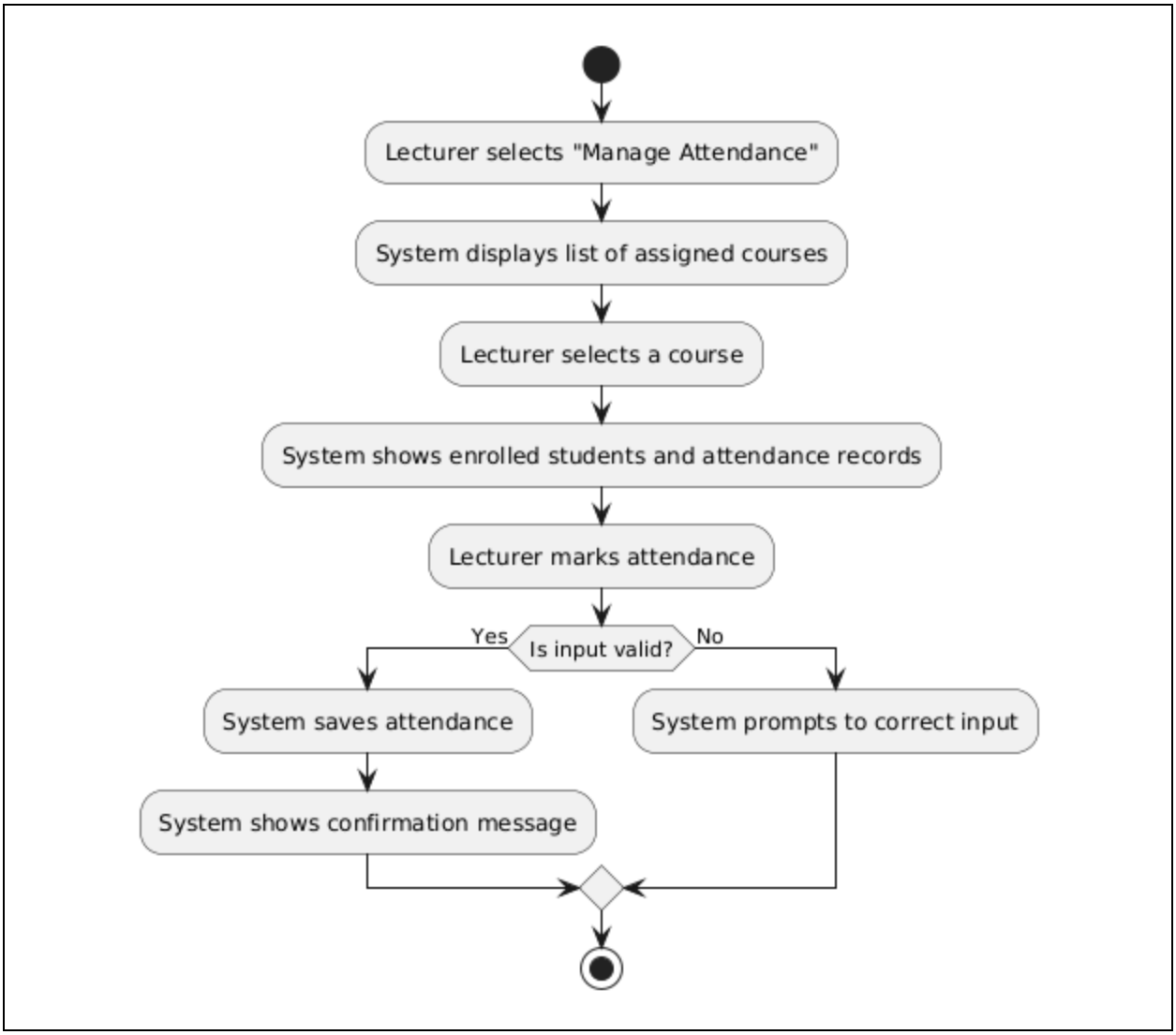

Figure 10
Activity diagram for F008 Manage Attendance

3.1.9 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

Table 12
Use case table for F009 View Student Progress

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	

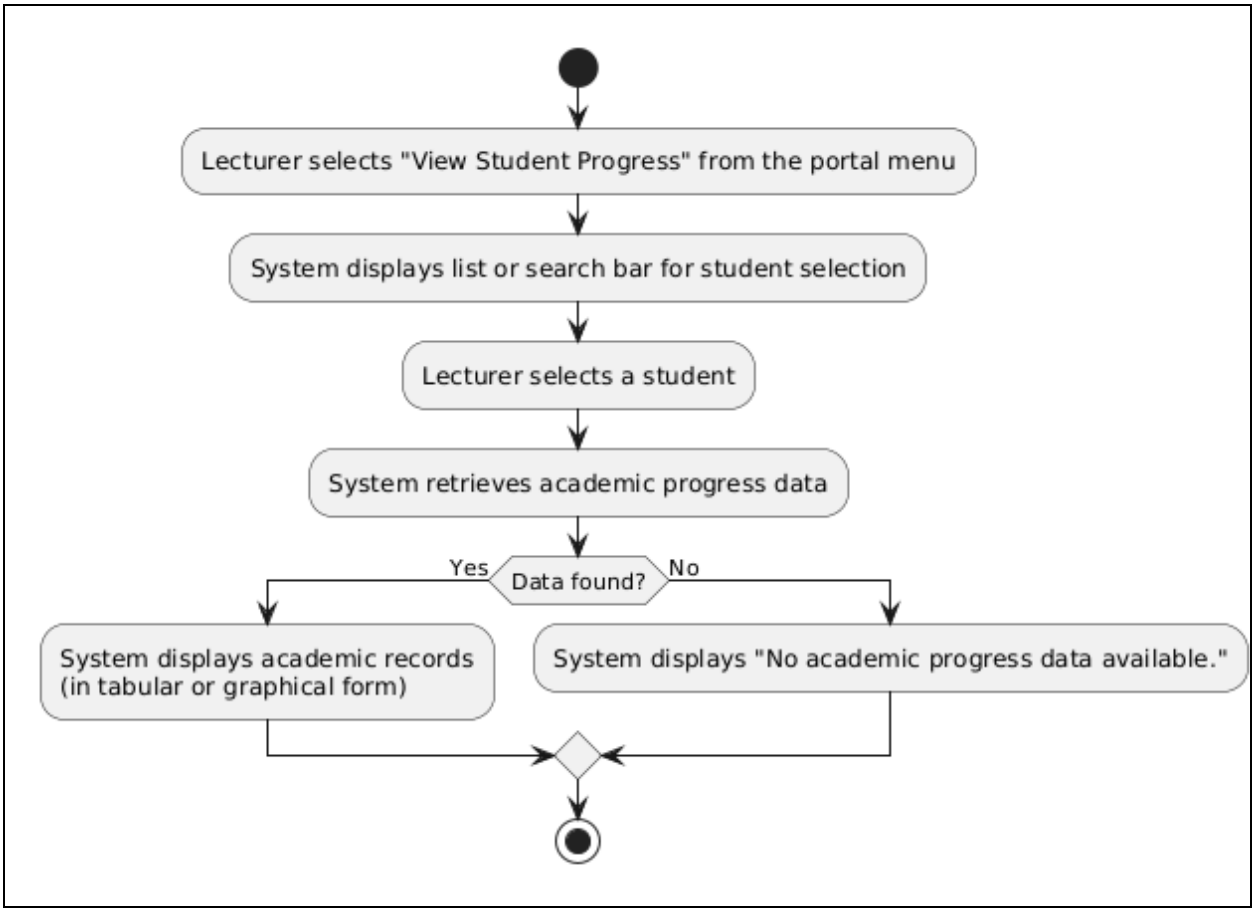

Figure 11
Activity diagram for F009 View Student Progress

3.1.10 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

Table 13
Use case table for F010 View At-Risk Student Alerts

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	

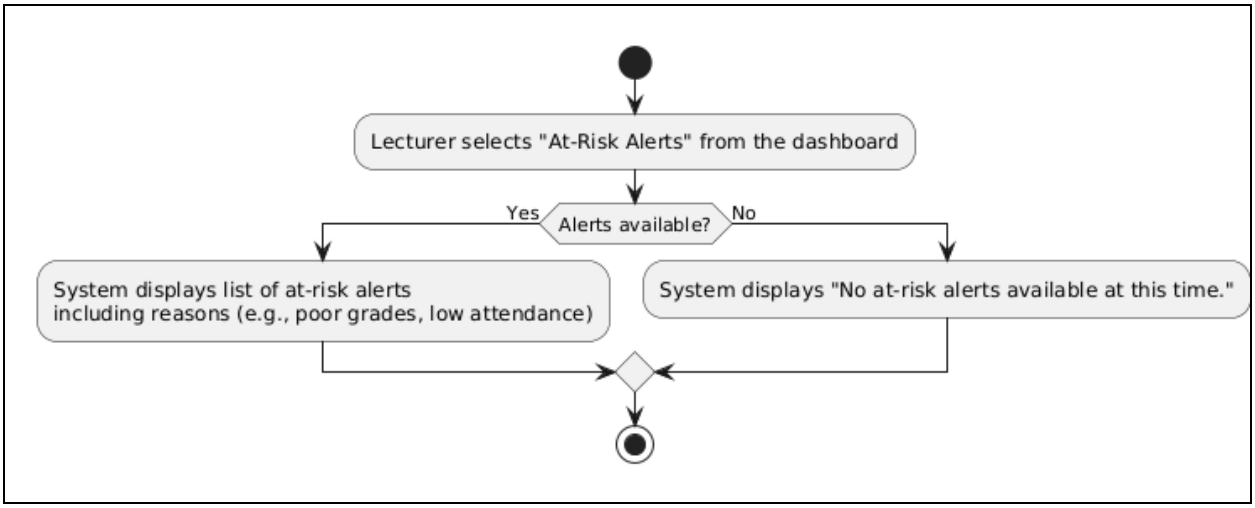

Figure 12
Activity diagram for F010 View At-Risk Student Alerts

3.1.11 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 notification conditions and time triggers are set, the system shall automatically send notifications when the criteria are met.		
Author	Yong Di Lun		

Requirement ID	REQ_F1104	Version	1.0
Description	When a notification is triggered and sent successfully, the system shall log the event and display confirmation to the user.		
Author	Yong Di Lun		

Requirement ID	REQ_F1105	Version	1.0
Description	When the user submits an incomplete notification rule, the system shall prompt to complete all mandatory fields.		
Author	Yong Di Lun		

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

Table 14
Use case table for F011 Manage Notification

Use Case ID	UC011	Version	1.0
Feature	F011 Manage Notification		
Purpose	To enable lecturers and administrators to define, schedule, and automate notifications to students and their parents based on specified triggers or timing.		
Actor	Lecturer, Administrator		
Trigger	User selects "Manage Notification" from the portal.		
Precondition	User must be logged in with appropriate permissions.		
Scenario Name	Step	Action	
Main Flow	1	User selects "Manage Notification" from the portal.	
	2	System displays the interface for notification setup.	
	3	User composes the message, selects recipients, and defines trigger conditions or schedule.	
	4	User saves or activates the automated notification rule.	
	5	System evaluates conditions periodically and sends notifications when conditions are met.	

Alternate Flow – Missing Fields	3.1	If required fields are missing, the system prompts the user to complete the definition.
Rules	Notifications must be time-stamped, logged for auditing, and clearly associated with the trigger conditions and the sender. Only authorized users can configure rules targeting parents.	
Author	Yong Di Lun	

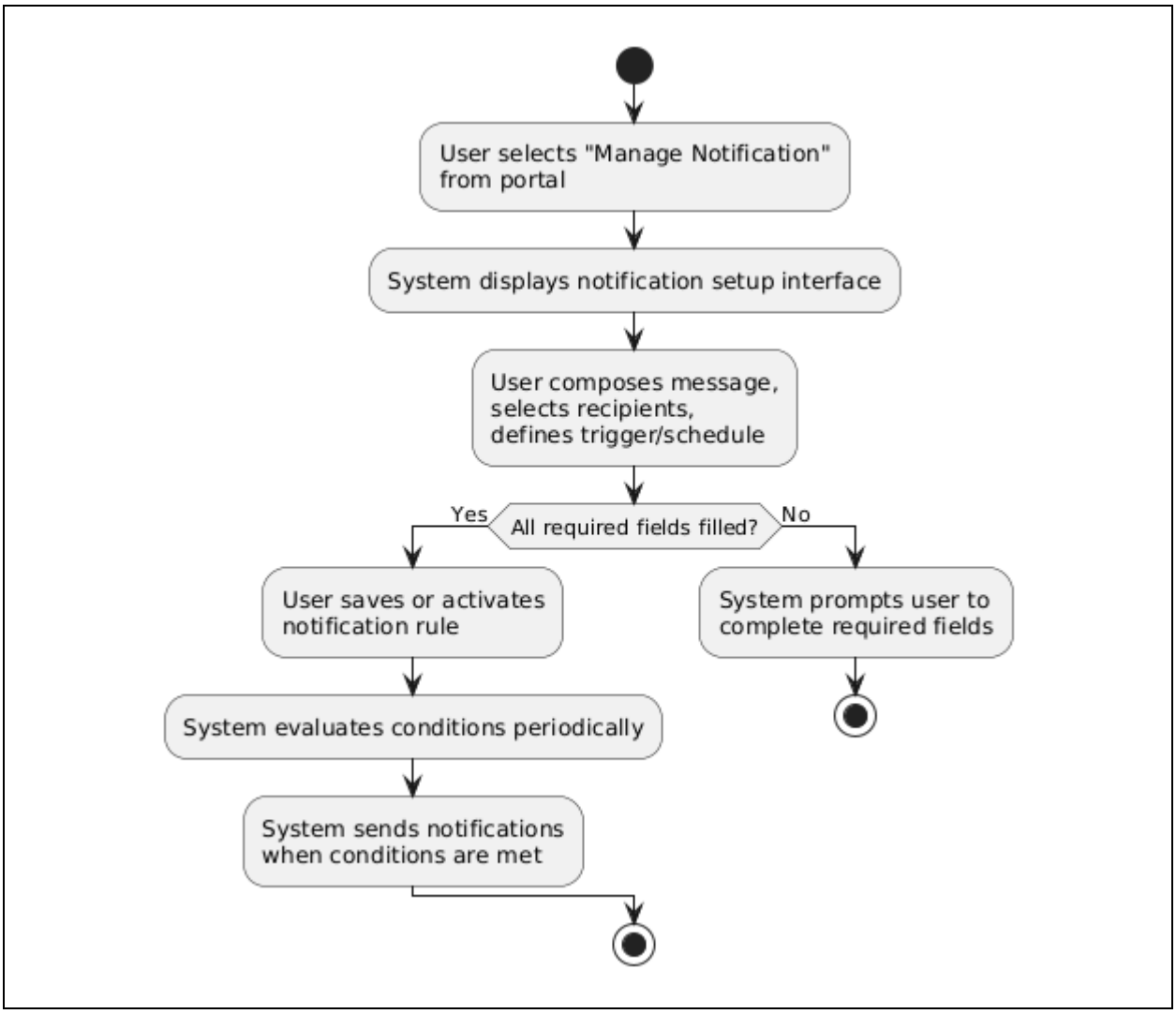

Figure 13
Activity diagram for F011 Manage Notification

3.1.12 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 system issue 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 system issue, 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 system issue 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 system issue 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

Table 15
Use case table for F012 View System Issue

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 system issue.
	3	Admin selects a system issue to view.
	4	System retrieves and displays the system issue data.
Alternate Flow – No issue Found	2.1	If no system issues are available, the system shows "No system issues available at this time."
Rules	System issue access must be role-based and updated to reflect the latest system data.	
Author	Yong Di Lun	

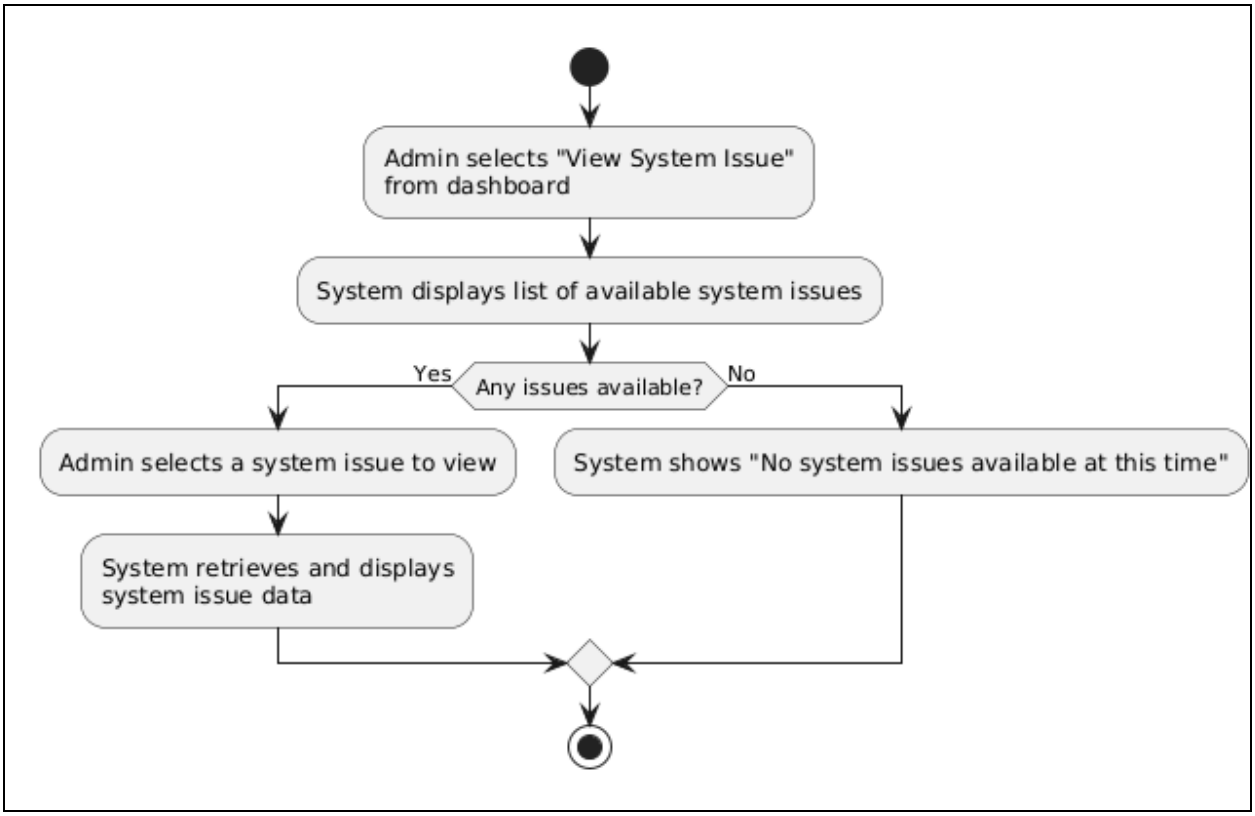

Figure 14
Activity diagram for F012 View System Issue

3.1.13 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

Table 16
Use case table for F013 Monitor System Access Log

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	

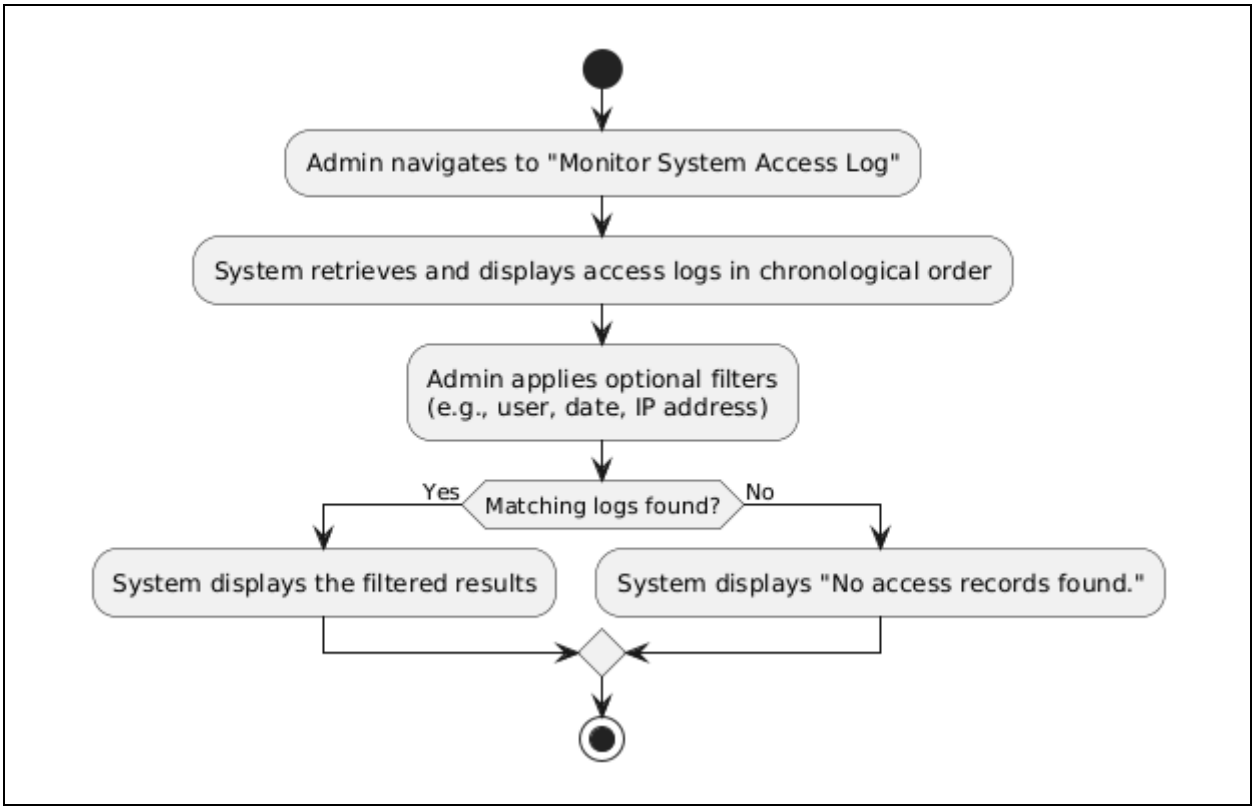

Figure 15
Activity diagram for F013 Monitor System Access Log

3.1.14 F014 View Fee Reports

The functional requirement for Generate Fee Report is as followed.

Requirement ID	REQ_F1401	Version	1.0
Description	When an admin selects "View 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

Table 17
Use case table for F014 View Fee Reports

Use Case ID	UC014	Version	1.0
Feature	F014 View Fee Reports		
Purpose	To enable administrators to generate comprehensive reports on student fee payments and outstanding balances.		
Actor	Admin		
Trigger	Admin selects "View 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 "View 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."	
	4.2.1	Admin selects "Export" or "Print" option from the report view.	

Alternate Flow – Export or Print Report	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	

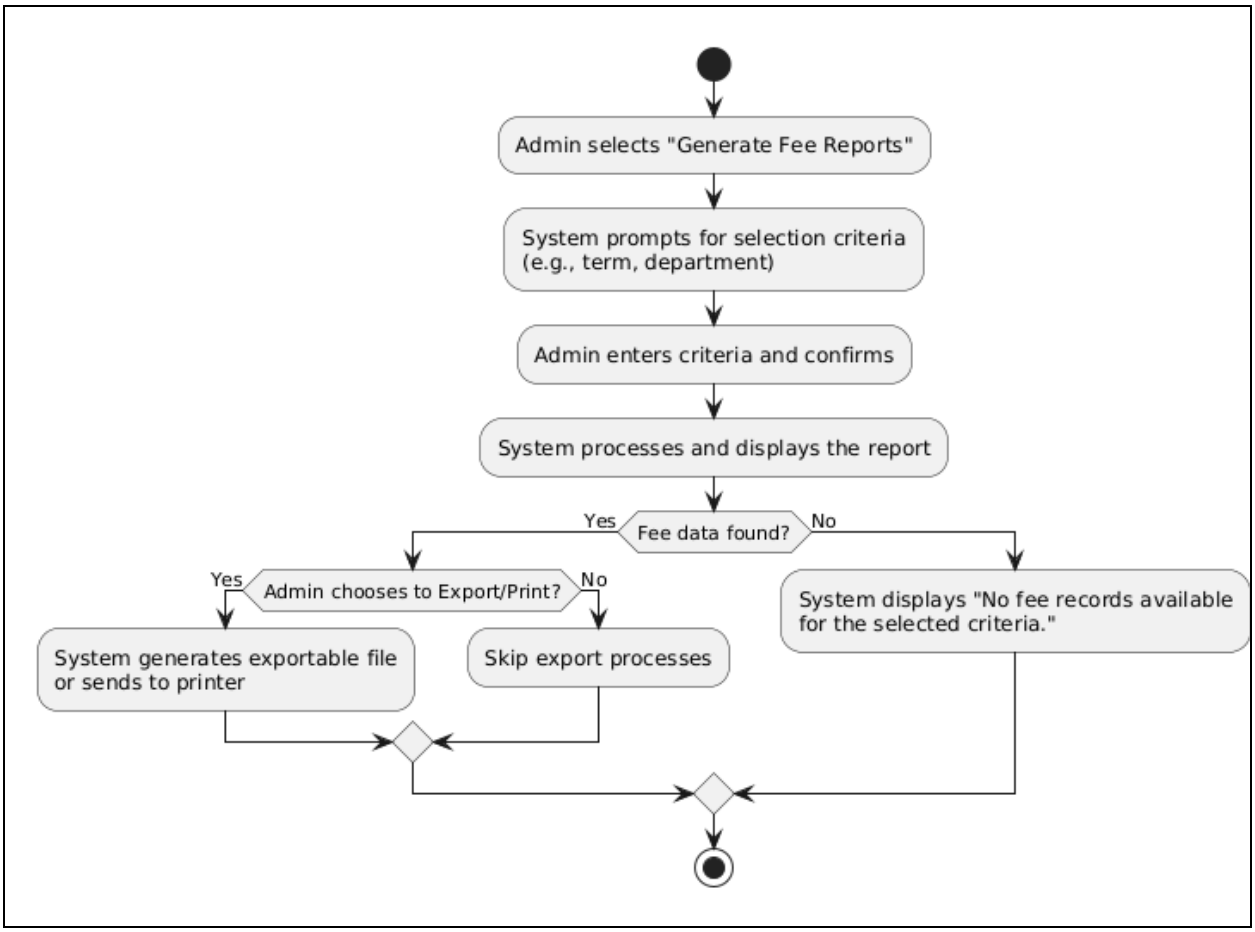

Figure 16
Activity diagram for F014 View Fee Reports

3.1.15 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

Table 18
Use case table for F015 View Enrollment Statistics

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	

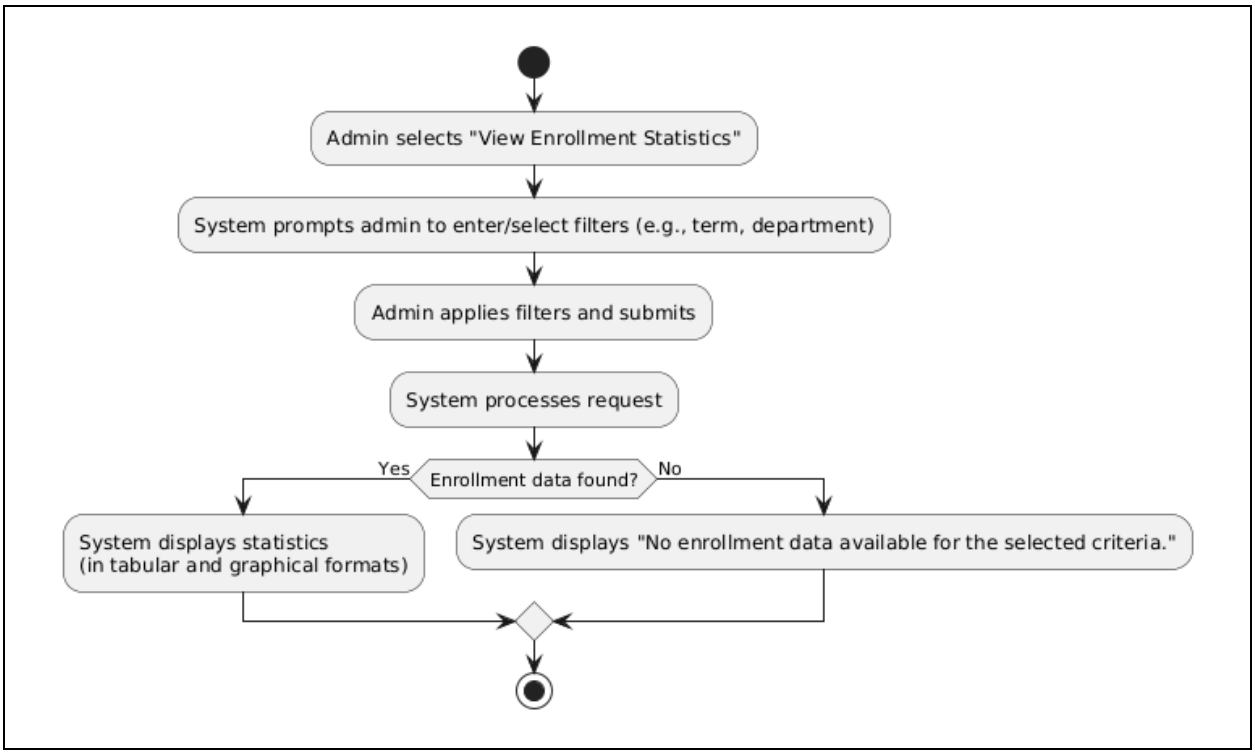

Figure 17
Activity diagram for F015 View Enrollment Statistics

3.1.16 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

Table 19
Use case table for F016 View Advanced Analytics Dashboard

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		

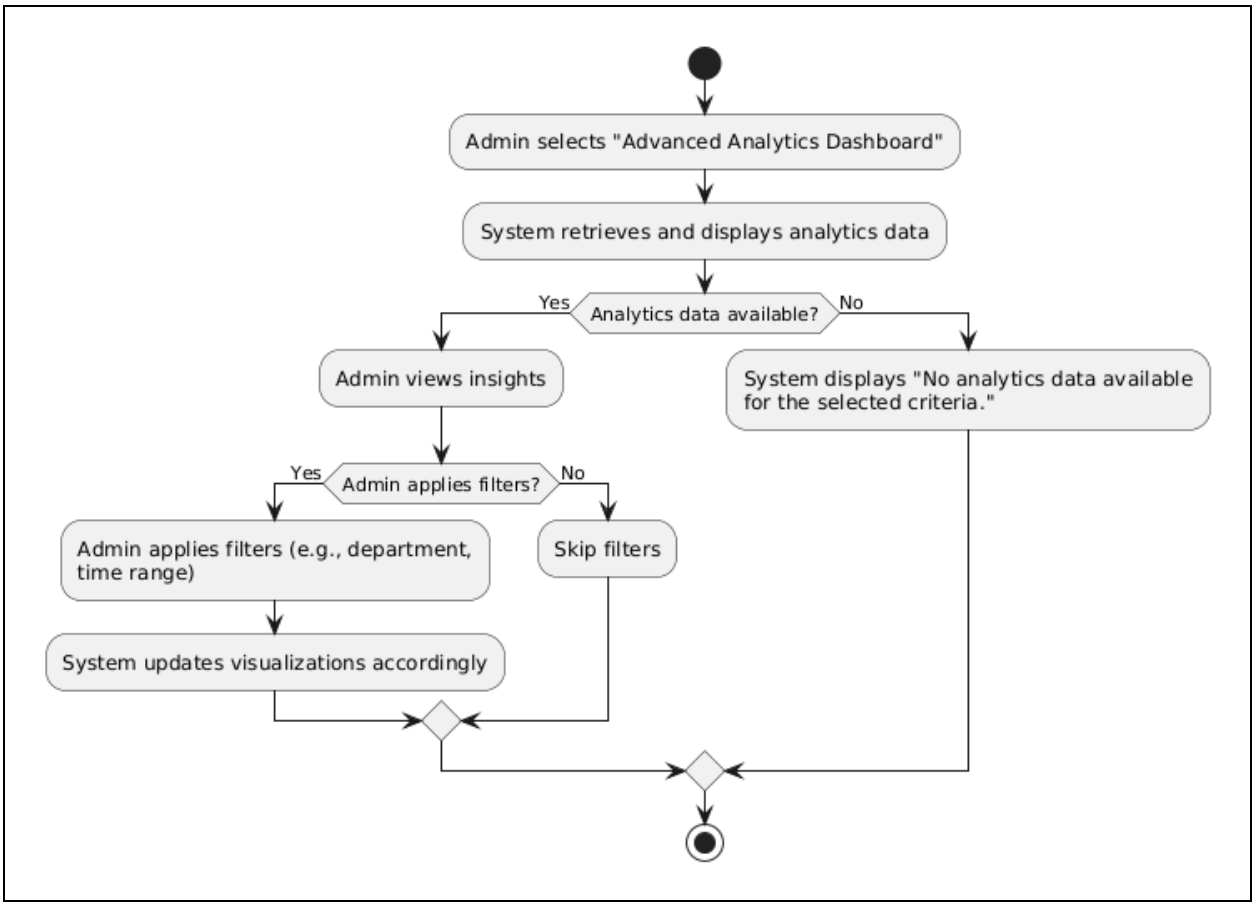

Figure 18
Activity diagram for F016 View Advanced Analytics Dashboard

3.1.17 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

Table 20
Use case table for F017 Send SMS Notifications

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		

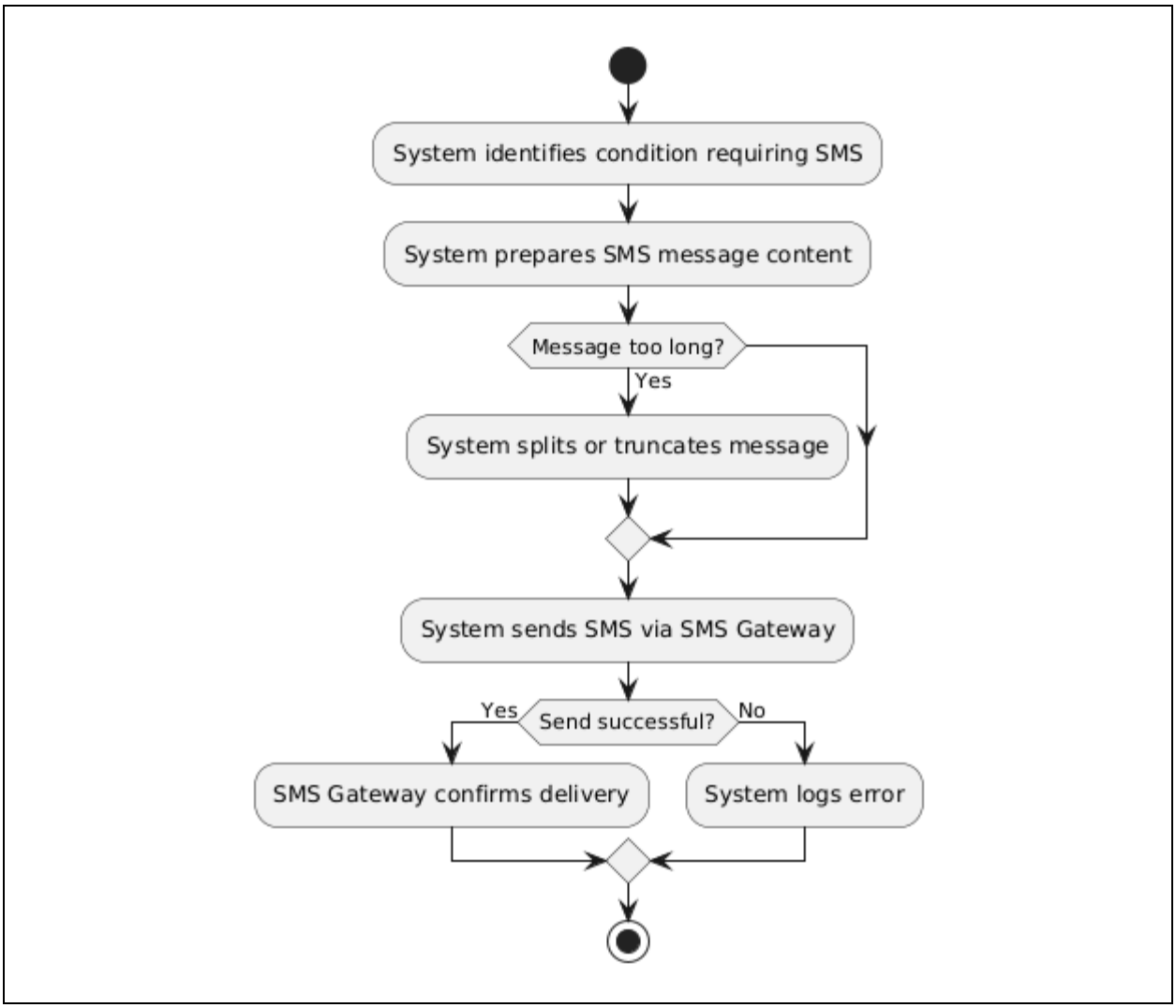

Figure 19
Activity diagram for F017 Send SMS Notifications

3.1.18 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

Table 21
Use case table for F018 Sync Academic and Billing Data

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			

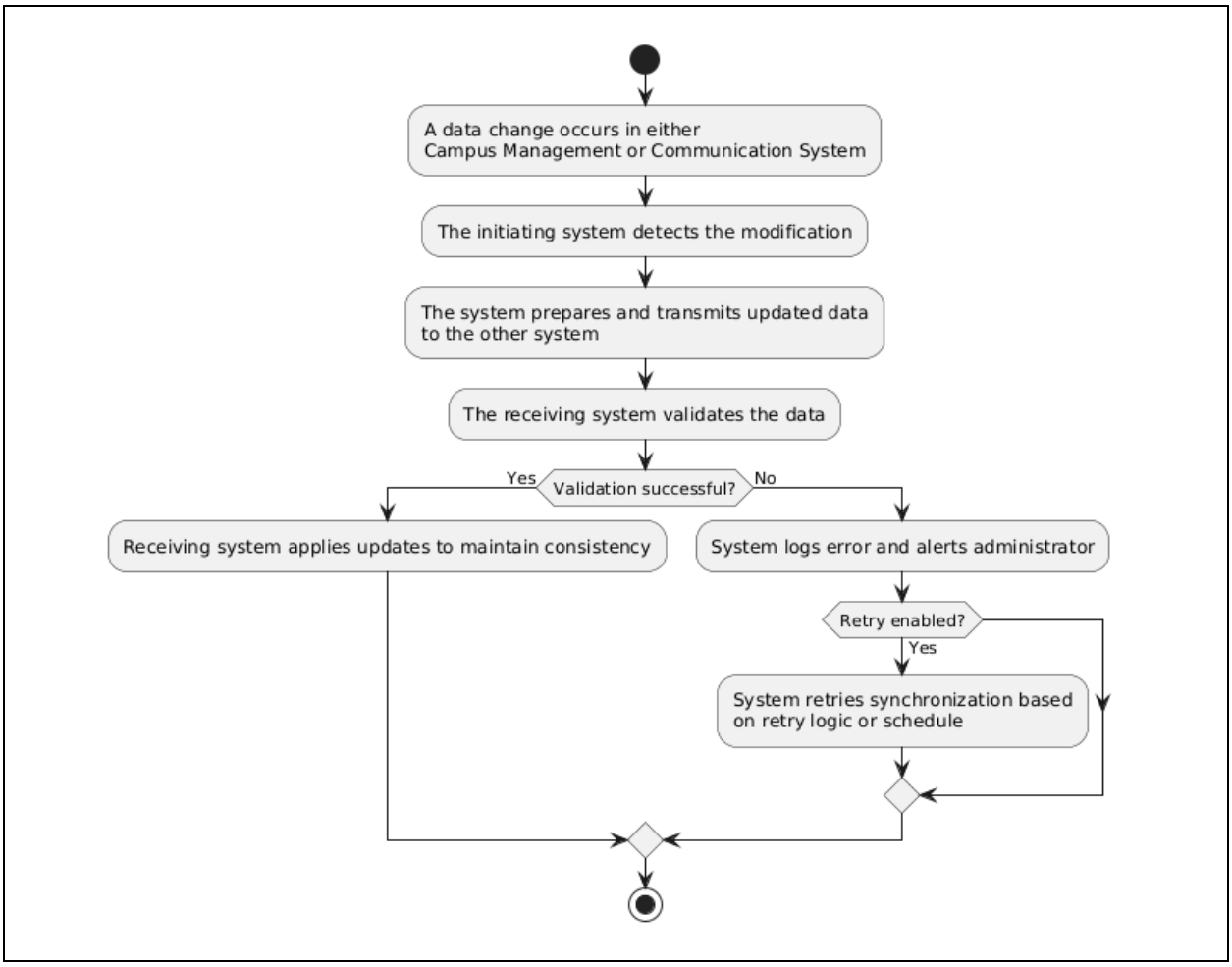

Figure 20
Activity diagram for F018 Sync Academic and Billing Data

3.2 Performance Requirements

Performance requirements ensure the system is responsive, scalable, and efficient. These requirements define how quickly the system reacts to inputs, how much data it can handle, and how reliably it performs under normal and peak conditions.

Table 22
Performance Requirements

No.	Requirement	Description
PR1	Response Time	The system must respond to user actions within 2 seconds for 95% of all requests.
PR2	Concurrent Users Support	The system should support a minimum of 500 concurrent users, including students, lecturers, and administrators.
PR3	System Uptime	The system must be available 99.9% of the time over any 30-day period.

PR4	Data Processing Speed	Functions like report generation, analytics dashboards, and fee report calculations should complete in less than 5 seconds.
PR5	Scalability	The system should scale vertically and horizontally to accommodate increased users or features in the future.
PR6	Database Performance	Queries such as retrieving grades, attendance records, and progress reports should execute in under 1 second for 95% of cases.
PR7	Notification Delivery Time	Automated or manual notifications should be delivered within 10 seconds of submission.
PR8	Data Synchronization	Updates made by one role must reflect in related modules in real time or within 2 seconds.
PR9	Resource Utilization	CPU and memory usage should remain within 70% under normal load to allow for peak capacity.
PR10	Backup Frequency	System data should be backed up daily with incremental backups every hour during active hours.

3.3 Usability Requirements

Usability requirements ensure the system is easy to use, intuitive, and accessible to all types of users. These requirements promote efficiency, satisfaction, and error prevention for both technical and non-technical users.

Table 23
Usability Requirements

No.	Requirement	Description
UR1	Intuitive Navigation	The user interface should have a consistent layout with clearly labeled menus and actions.
UR2	Responsive Design	The system must work seamlessly on desktops, tablets, and smartphones.
UR3	Accessibility Compliance	The system should comply with WCAG 2.1 Level AA standards to support users with disabilities.
UR4	Role-Based UI	Only relevant functions and data should be visible to a user based on their role.
UR5	Interactive Help Features	Contextual help icons, tooltips, and a searchable FAQ should be available throughout the interface.

UR6	Language and Terminology	Use simple, non-technical language for students and clear academic/administrative terms for staff.
UR7	Onboarding Process	New users should be guided with an optional walkthrough or tutorial when they first log in.
UR8	Consistent Feedback	The system should provide visual or textual feedback for every action.
UR9	Undo and Confirmation	Critical actions should require confirmation and allow undo where feasible.
UR10	Error Prevention and Handling	Input validation must prevent incorrect entries and guide users with clear error messages.
UR11	Session Timeout Warning	The system should warn users before automatic logout due to inactivity.

3.4 Interface Requirements

3.4.1 System Interfaces

This section outlines the key system interfaces that enable communication between the UniComm 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.

Table 24
Key system interfaces

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.

3.4.2 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.

Table 25

Logical characteristics and requirements for each user interface

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	Enable secure access to grade data, refresh data

		lecturers submit grades - Graphical trend of performance	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-	Custom messaging UI, delivery scheduler, condition logic engine, template library, and delivery receipts.

		based delivery - Predefined message templates - Track message delivery and view confirmation status	
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.

3.4.3 Hardware Interfaces

This section outlines the logical characteristics of hardware interfaces used by the UniComm 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.

Table 26

Logical characteristics of hardware interfaces used by UniComm Portal

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).

3.4.4 Software Interfaces

This section describes all software products required to operate the UniComm 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.

Table 27
Software products required to operate UniComm Portal

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

3.4.5 Communication Interfaces

This section provides a comprehensive overview of the communication interfaces utilized by the UniComm 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.

Table 28
Overview of communication interfaces utilized by UniComm Portal

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.

3.4.6 External Interfaces

This section describes the external interfaces that facilitate data exchange and interaction between the system and third-party services, clients, and platforms. These interfaces include both input and output channels for synchronizing data, sending notifications, authenticating users, enabling browser-based interactions, and exporting administrative reports. Each interface is defined by its purpose, communication endpoints, data formats, timing mechanisms, and relationships with other system components.

3.4.6.1 CMS Data Sync Input

Table 29

Field	Detail
Interface Name	CMS Data Sync Input
Purpose	Synchronizes academic and administrative data such as student profiles, enrollments, grades, schedules, and attendance.
Source / Destination	Source: Campus Management System (CMS) API
Valid Range / Accuracy	Schema-compliant JSON/XML; tolerates non-critical inconsistencies
Units of Measure	Structured academic and student data
Timing	Real-time on-demand
Relationships	Feeds: Student Dashboard, Grade Viewer, Schedule Viewer, Analytics, Admin Reports
Data Format	JSON / XML
Command Format	GET /api/cms/sync
Data Items Included	Student ID, Courses, Grades, Attendance Records, Enrollment, Timetable

3.4.6.2 SMS Notification Output

Table 30

Field	Detail
Interface Name	SMS Notification Output
Purpose	Sends transactional SMS alerts to students or guardians (e.g., attendance, billing).

Source / Destination	Destination: SMS Gateway
Valid Range / Accuracy	Up to 160 UTF-8 characters; delivery receipt optional
Units of Measure	Characters per message
Timing	Event-driven or scheduled
Relationships	Triggered by: system events, admin messaging tools
Data Format	JSON
Command Format	POST /sendSMS
Data Items Included	Phone number, Message body, Event type, Delivery status

3.4.6.3 SSO Authentication Input

Table 31

Field	Detail
Interface Name	SSO Authentication Input
Purpose	Authenticates users through university Single Sign-On using OAuth 2.0 / OpenID Connect.
Source / Destination	Source: University Identity Provider
Valid Range / Accuracy	JWT token; expiration typically 1 hour
Units of Measure	Token (string), time (seconds)
Timing	On login or session renewal
Relationships	Required for all authenticated interfaces
Data Format	JSON (JWT)
Command Format	POST /auth/token
Data Items Included	Client ID, Redirect URI, Access Token, User Info, Scope

3.4.6.4 Web Client Input/Output

Table 32

Field	Detail
Interface Name	Web Client Input/Output
Purpose	Facilitates user interactions through a browser-based interface.
Source / Destination	Source: Web client (browser); Destination: Web server
Valid Range / Accuracy	Validated via UI constraints and backend validation rules
Units of Measure	Varies by module (e.g., grades, messages, schedules)
Timing	Real-time user interaction

Relationships	All user-facing components (dashboard, notifications, forms)
Data Format	JSON via HTTPS
Command Format	RESTful endpoints (GET/POST/PUT/DELETE)
Data Items Included	User inputs, selections, session data, retrieved records

3.4.6.5 Admin Fee Report Export Output

Table 33

Field	Detail
Interface Name	Admin Fee Report Export Output
Purpose	Generates financial reports for download.
Source / Destination	Destination: Admin client (browser or export module)
Valid Range / Accuracy	Accurate as per database records at export time
Units of Measure	Report files (PDF, XLSX)
Timing	On admin request or schedule
Relationships	Uses: CMS Data
Data Format	PDF, XLSX
Command Format	GET /api/reports/export
Data Items Included	Fees

3.5 Logical Database Requirements

This section defines the logical structure of the database used by the system. It includes key entities such as students, lecturers, administrators, and related academic components. The relationships between entities are established using foreign keys to ensure data integrity and enforce referential constraints. Each entity contains a primary key that uniquely identifies its records.

3.5.1 Class diagram

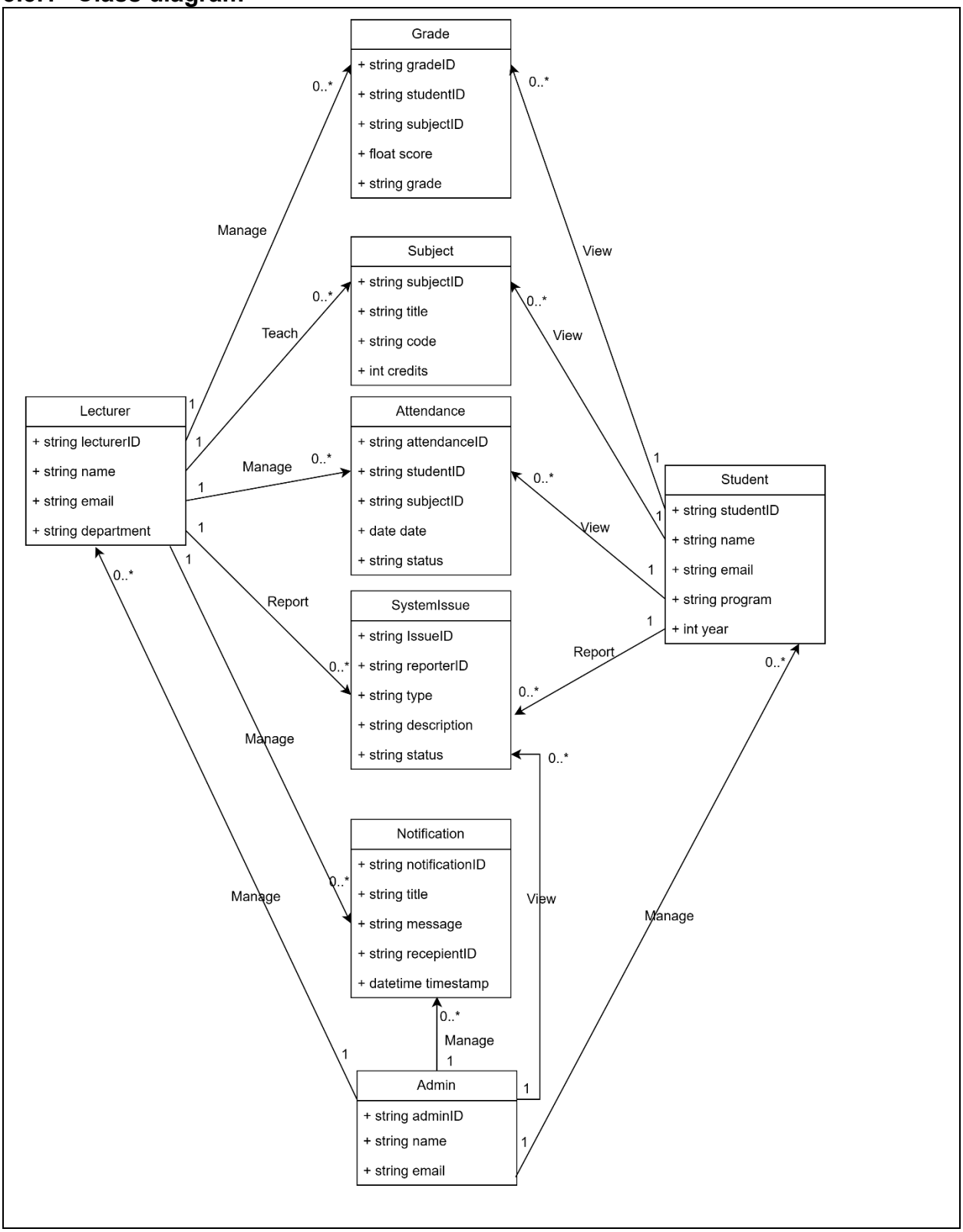

Figure 21
Class diagram for UniComm system

3.5.2 Class attributes and relationships table

Table 34

Class	Attributes	Relationships
Student	studentID (PK), name, email, program, year	- View many Grade - View many Attendance - View many Subject - Report many SystemIssue
Lecturer	lecturerID (PK), name, email, department	- Teach many Subject - Manage many Grade - Manage many Attendance - Report many SystemIssue
Admin	adminID (PK), name, email	- Manage many Lecturer - Manage many Student - Manage many SystemIssue - Manage many Notification
Subject	subjectID (PK), title, code, credits	- Taught by one Lecturer - Viewed by many Student
Grade	gradeID (PK), studentID (FK), subjectID (FK), score, grade	- Managed by one Lecturer - Viewed by many Student
Attendance	attendanceID (PK), studentID (FK), subjectID (FK), date, status	- Managed by one Lecturer - Viewed by many Student
SystemIssue	issueID (PK), reporterID (FK), type, description, status	- Reported by many Student/Lecturer - Managed by one Admin
Notification	notificationID (PK), title, message, recipientID (FK), timestamp	- Managed by one Admin - Viewed by many Student/Lecturer

3.6 Design Constraints

Design constraints are limitations or rules that the development team must follow during the software design process. These may come from organizational policies, external standards, existing systems, or technological requirements.

Table 35

Design constraints during software design process

No.	Constraint	Description
DC1	University Branding Compliance	The user interface must comply with the university's official branding guidelines, including logo placement, colors, and typography.
DC2	Technology Stack	The system must be developed using open-source technologies, specifically using a PostgreSQL database and a Python-based backend (e.g., Django or Flask).
DC3	Integration with Existing Systems	The software must be able to integrate with the university's existing student information system (SIS) through RESTful APIs.
DC4	Web-Based Platform	The system must be entirely web-based and accessible via standard browsers (Chrome, Firefox, Edge).
DC5	Data Privacy Regulations	The system must comply with local and international data protection regulations (e.g., GDPR, local education data privacy laws).
DC6	Single Sign-On (SSO)	The system must support SSO authentication using the university's existing identity provider.
DC7	Multilingual Support	The interface must support both English and the local language, with future scalability to add more.

3.7 Software System Attributes

These attributes define the quality characteristics of the system, influencing its usability, performance, security, and long-term effectiveness.

Table 36
Attributes of software system

Attribute	Description
Reliability	The system must be able to recover from unexpected crashes or errors within 1 minute and resume normal operations without data loss.
Availability	The system should be available 99.9% of the time during working hours (Monday to Friday, 8:00 AM to 6:00 PM), with scheduled maintenance occurring outside of these hours.
Security	The system must implement role-based access control (RBAC), secure session management, input validation, and encryption (AES-256 or TLS 1.2+) for all sensitive user data.
Maintainability	The system should use modular architecture and follow clean coding standards (e.g., PEP8 for Python) to allow easy maintenance and updates.
Portability	The software must run on both Linux and Windows servers without requiring significant reconfiguration or OS-specific dependencies.
Scalability	The system should support scaling up to handle increased numbers of users or modules without performance degradation.

3.8 Supporting Information

This section includes supplemental details that support the development of the UniComm Portal, including user research, observations, questionnaire analysis, KJ Method findings, and relevant input/output samples. These elements inform feature prioritization and user-centered design decisions.

3.8.1 Questionnaire Results by Stakeholder (1/5/2025 – 12/5/2025)

A series of questionnaires were distributed to key user groups: students, parents, lecturers, and administrators. Participants evaluated specific features of the current Campus Management System (CMS), which were categorized using the Kano Model (Dissatisfiers, Satisfiers, Delighters). These insights directly influenced system redesign efforts.

3.8.1.1 Student Questionnaire Results

Table 37

Feature	Classification
Secure login system	Dissatisfier
View academic grades (past/current)	Dissatisfier
Organized class schedule view	Satisfier
Subject details view	Satisfier
Personalized assignment/exam reminders	Delighter

3.8.1.2 Parent Questionnaire Results

Table 38

Feature	Classification
SMS grade notifications	Dissatisfier
Fee payment reminder notifications	Dissatisfier
Billing statement view	Satisfier
Communication with lecturers/admins	Delighter
Automatic grade push (no login needed)	Delighter
Achievement highlights notifications	Delighter

3.8.1.3 Lecturer Questionnaire Results

Table 39

Feature	Classification
Grade input system	Dissatisfier
Secure access (role-based login)	Dissatisfier
Digital attendance system	Dissatisfier
Student progress overview	Satisfier
Auto-generated academic reports	Satisfier
Performance alerts for at-risk students	Delighter

3.8.1.4 Admin Questionnaire Results

Table 40

Feature	Classification
User role management	Dissatisfier
System access logs	Dissatisfier
Fee reporting	Satisfier
Enrollment statistics dashboard	Satisfier
Advanced analytics dashboard	Delighter

3.8.2 KJ Method Findings (22/4/2025 – 24/4/2025)

3.8.2.1 Question 1 – Students

- Track class attendance
- Monitor academic performance
- View exam schedules
- Access enrollment information
- Check outstanding tuition/fees

3.8.2.2 Question 2 – Lecturers

- Mark and view student attendance
- Input grades and monitor academic progress
- Upload learning materials
- Make announcements via Gmail or portal notification system

3.8.2.3 Question 3 – Administrators

- Flagging system for problem reporting
- Internal messaging system for deadline alerts
- Management of attendance, enrollment, fee tracking, and academic records

3.8.2.4 Question 4 – Parents

- Updates on academic performance
- Attendance records
- Financial obligations
- Disciplinary issues

3.8.3 Stakeholder Observations (29/4/2025 – 1/5/2025)

3.8.3.1 Students

- Observation on previous system: Current CMS access to many tools, but system is overly complex.
- Proposal: Create a simplified interface focusing on academic essentials and reminders.

3.8.3.2 Lecturers

- Observation on previous system: Current CMS access to many tools, but system is overly complex.
- Proposal: Streamline interface to focus on student engagement and assessment features only.

3.8.3.3 Administrators

- Observation on previous system: Current CMS manage many modules across systems.
- Proposal: Provide a dedicated admin dashboard for managing student monitoring features separately from CMS.

3.8.3.4 Parent

- Observation on previous system: Parents receive updates via SMS and other indirect channels, without direct CMS access. Current messages are often too general, delayed, or inconsistent, making it hard for parents to track their child's academic progress.
- Proposal: Develop a more structured SMS system and a simplified platform for admins and lecturers to send timely, targeted updates. This may help ensure parents receive clear and relevant information on key academic matters.

3.8.4 Sample Output

3.8.4.1 Academic Performance Report (PDF)
Student Name: John Doe

Student ID: 20251234

Term: Semester 1, 2025

Program: B.Sc. Computer Science

Generated On: May 13, 2025

Subjects & Grades:

Subject Name	Grade	Attendance (%)	Remarks
Data Structures	A	93%	Strong grasp of concepts
Algorithms	A-	90%	Efficient problem-solving skills
Computer Networks	B+	85%	Needs more practical exposure
Operating Systems	A+	95%	Excellent understanding
Database Systems	B	80%	Can improve SQL skills
Software Engineering	A+	100%	Outstanding teamwork and delivery

General Comments:

John has demonstrated excellent academic performance in core computer science subjects. Continued focus on practical applications and group collaboration will further enhance his skill set.

3.8.4.2 Attendance Summary (CSV/Table)
Format: CSV or displayable HTML table

Student ID	Student Name	Subject	Total Classes	Classes Attended	Attendance Percentage
20251234	John Doe	Data Structures	14	13	93%
20251234	John Doe	Algorithms	14	13	90%
20251234	John Doe	Computer Networks	14	12	85%
20251234	John Doe	Operating Systems	14	13	95%
20251234	John Doe	Database Systems	14	11	80%
20251234	John Doe	Software Engineering	14	14	100%

3.8.4.3 Parent Notification & Communication (Excel .xlsx attachment)
Filename: John_Doe_Sem1_2025.xlsx

Filename: John_Doe_CS_Sem1_2025.xlsx

Sheet Content:

Student Name	Student ID	Subject Name	Grade	Attendance Percentage	Remarks
John Doe	20251234	Data Structures	A	93%	Strong grasp of concepts
John Doe	20251234	Algorithms	A-	90%	Efficient problem-solving skills
John Doe	20251234	Computer Networks	B+	85%	Needs more practical exposure
John Doe	20251234	Operating Systems	A	95%	Excellent understanding
John Doe	20251234	Database Systems	B	80%	Can improve SQL skills
John Doe	20251234	Software Engineering	A+	100%	Outstanding teamwork and delivery

Message body:

Dear Parent/Guardian,

Please find attached the academic performance summary of John Doe for Semester 1, 2025 (B.Sc. Computer Science).
For any questions or clarifications, feel free to contact the program coordinator.

Best regards,
Department of Computer Science

3.8.5 Supporting or Background Information

This section provides contextual information for readers to better understand the basis and scope of the UniComm Portal. The findings are derived from direct stakeholder engagement, including questionnaires, observations, and the KJ Method. These efforts allowed the identification of the most crucial functionalities expected by each stakeholder group (students, lecturers, administrators, and parents).

Key background points:

- Existing Campus Management Systems (CMS) are overly complex.
- Stakeholders prefer a streamlined system that provides only the necessary information for daily use.
- Security and usability are significant concerns due to the amount of sensitive student data handled by current systems.
- Communication gaps exist, especially between the university and parents, as most current updates are delivered via indirect SMS systems without proper interfaces.

This information supports the rationale for a role-based communication and services portal that simplifies user interaction, enhances security, and improves stakeholder engagement.

3.8.6 Description of the Problems to Be Solved by the Software

The current CMS poses several challenges, which the proposed UniComm Portal aims to resolve:

- **Overcomplexity**
  The existing CMS is overloaded with features that are irrelevant to certain user roles, making it difficult for users to navigate and increasing the learning curve.
- **Communication Gaps with Parents**
  Notification cannot customize by admin and parent, which may lead inaccurate notification and mis communication.
- **Administrative Inefficiencies**
  Administrators currently use the CMS to manage various unrelated systems. This blending of responsibilities leads to bottlenecks in student monitoring and data management.
- **Security and Data Privacy Risks**
  The presence of sensitive personal and academic data within a single, centralized system increases the risk of the system.

The new portal is designed to:

- Offer customized dashboards per user role.
- Facilitate streamlined academic tracking.
- Provide secure, timely, and structured communication.
- Separate out the system to reduces access to the core system, helping to improve overall data security and privacy.

3.8.7 Special Packaging Instructions for Code and Media

The software and any associated media must follow strict packaging and deployment standards to ensure security, portability, and compliance with institutional and legal requirements.

Security and Deployment Guidelines:

- Authentication & Authorization: All users must authenticate through secure Single Sign-On (SSO) with Role-Based Access Control (RBAC).
- Encryption: Sensitive data (e.g., student grades, attendance, financial records) must be encrypted during transmission (TLS) and at rest (AES-256).
- Code Packaging: All software distributions must be containerized (e.g., Docker) for consistent environment deployment and must be signed with secure certificates.
- Installation Media: Should be distributed as a digitally signed installer or via a secure internal repository with version control.
- Export Compliance: Any data export (e.g., reports, student lists) must be auditable and adhere to university data governance policies and local regulations (e.g., PDPA, GDPR).
- Initial Loading Requirements: Setup scripts must include test data and configuration templates. An admin interface must allow initial user role assignment and permission mapping.

Note: Unless explicitly referenced in the system's functional specification, these items are considered supporting information, not functional requirements.

4 Verification

4.1 Verification Approach

The verification of the UniComm Portal will follow these strategies:

- **Requirement-Based Testing**
  - Test cases will be mapped directly to functional and non-functional requirements.
- **Use Case Validation**
  - End-to-end scenario tests will be developed based on use cases defined in Section 3.
- **Automated and Manual Testing**
  - **Automated**: Unit and integration tests will verify backend logic.
  - **Manual**: Tests will be conducted to assess UI behavior and overall usability.
- **System Testing**
  - Comprehensive system-level testing will ensure proper interaction between all modules.

- **User Acceptance Testing (UAT)**
    - End users will evaluate the system in a staging environment to ensure it meets business and user expectations.

4.2 Verification Criteria

This section outlines the verification criteria for each functional, non-functional, and performance requirement of the UniComm Portal. Each requirement is mapped to a corresponding verification method, such as functional testing, UI testing, database validation, or performance evaluation. The success criteria define the conditions under which a requirement is considered fulfilled, ensuring that the system behaves as intended and meets user expectations. These criteria will guide test case design and validation throughout the development and deployment lifecycle.

Table 41
Verification criteria of each requirement of UniComm Portal

Requirement ID	Requirement Summary	Verification Method	Success Criteria
REQ_F101 – F106	User Login Process	Functional Test, UI Test	Login succeeds/fails based on valid/invalid credentials.
REQ_F201 – F204	View Class Schedule	UI Test, Database Test	Student's schedule is fetched correctly and displayed in tabular/calendar form.
REQ_F301 – F303	View Subject Details	Functional Test, UI Test	Subject details are correctly fetched and displayed depending on its availability.
REQ_F401 – F403	View Academic Grades	UI Test, DB Comparison	Grade data matches backend records; correct formatting.
REQ_F501 – F504	View Notification	Functional Test	Notification panel correctly displays notifications

			depending on whether they are unread, read or not available.
REQ_F601 – F605	Report System Issue	Functional Test	User is able to submit a report on any issues and will be prompted to try again in case there are required fields life empty.
REQ_F701 – F705	Manage Grade	Functional Test	Lecturer is able to update and save the grade of a student in a course.
REQ_F801 – F805	Manage Attendance	Functional Test	Lecturer is able to update and save students' attendance record, and system displays a confirmation message for the lecturer's actions.
REQ_F901 – F905	View Student Progress	Functional Test, DB comparison	System correctly displays student's most recent progress data in a clear tabular or graphical summary.
REQ_F1001 – F1005	View At-Risk Student Alert	Functional Test	Once certain risk conditions have been met, the system automatically generates an alert and delivers it to the responsible lecturer.

REQ_F1101 – F1105	Manage Notification	Functional Test	Notification form allows composing, scheduling and delivery tracking of messages to intended roles.
REQ_F1201 – F1205	View System Issue	Functional Test	Admin can view submitted reports, open report details export reports if available.
REQ_F1301 – F1305	Monitor System Access Log	Functional Test, Log Review	Access logs are displayed chronologically with filtering and export features working as expected.
REQ_F1401 – F1404	View Fee Reports	Functional Test	Reports are generated based on selected filters and available for export in multiple formats.
REQ_F1501 – F1504	View Enrollment Statistic	Functional Test	Enrollment data is shown based on selected filters in table/graph formats or appropriate message if empty.
REQ_F1601 – F1604	View Advanced Analytics Dashboard	Functional Test, UI Interaction	Dashboard loads analytic data, supports filters and exports charts correctly.
REQ_F1701 – F1704	Send SMS Notification	API Test, Message Logs	SMS is sent, segmented if long, and delivery confirmed or logged on failure.

REQF1801 – F1803	Sync Academic and Billing Data	Integration Test, Log Inspection	Synchronization events trigger correctly with data consistency validated and failures logged.
PR1 – PR10	Performance Requirements	Load/Stress Testing	Meets defined thresholds: ≤2s response, ≤70% CPU usage, etc.
UR1 – UR11	Usability Requirements	Heuristic Evaluation, User Testing	Users can navigate with minimal training; interface passes accessibility checks.

5 Appendices

5.1 Assumptions and Dependencies

The system assumes that users (students, lecturers, administrators) have access to the internet and a modern web browser.

It is assumed that the University's Campus Management System (CMS) is already deployed and operational.

The portal depends on continuous connectivity with the SMS Gateway to deliver timely notifications.

It is assumed that data stored in the CMS is accurate, up-to-date, and accessible via API or database connections.
The system depends on the availability and proper configuration of the university's Single Sign-On (SSO) service.
Cloud or on-premises infrastructure must support 24/7 hosting and scheduled maintenance.
Administrators are assumed to be trained in basic system configuration, data backup, and issue resolution.

5.2 Acronyms and Abbreviations

Table 42

Acronym	Full Term	Description
SRS	Software Requirements Specification	Document describing the software's functionality and constraints.
CMS	Campus Management System	Existing university system for academic and student data.
SMS	Short Message Service	Technology used for sending text messages.
SSO	Single Sign-On	Authentication method allowing users to log in with one set of credentials.
UI	User Interface	Visual interface for users interacting with the system.
API	Application Programming Interface	Used for communication between the portal and external systems.
DBMS	Database Management System	Manages data for users, grades, attendance, and more.
GPA	Grade Point Average	Measurement of a student's academic performance.

5.3 Glossary

Table 43: Glossary

Term	Definition
Portal	The web-based UniComm platform.
Student Dashboard	The interface where students can access their grades, attendance, and notifications.
Notification	A message generated by the system or admin, sent to users through the portal or SMS.
Attendance	Records indicating a student's presence or absence in scheduled classes.
Academic Record	Student data related to grades, subjects, and course progress.
SMS Gateway	A third-party service responsible for sending SMS notifications to users.
Role-Based Access	A system feature that grants permissions based on a user's role (e.g., student, lecturer, admin).
System Issue Report	A form submitted by users to notify administrators of technical problems.
Admin Panel	Administrative interface used for managing users, settings, reports, and notifications.

Table 44: Portal

Term:	Portal
Definition:	The web-based UniComm platform that provides users access to academic and administrative services.
Synonyms:	Online System Interface
Related Terms:	Web Portal, User Interface (generalization)
Examples/ Counter-examples	Students log into the portal to view grades and schedules

Table 45: Dashboard

Term:	Dashboard
Definition:	A user interface that provides an overview of key system information and actions.
Synonyms:	User Panel
Related Terms:	Student Dashboard, Admin Dashboard (specializations)
Examples/ Counter-examples:	Admin dashboard shows total users and system alerts

Table 46: Notification

Term:	Notification
Definition:	A message generated by the system or admin, sent to users through the portal or SMS.
Synonyms:	Alert, Message
Related Terms:	SMS Notification (specialization)

Examples/ Counter-examples:	System sends a fee reminder via SMS to parents

Table 47: Attendance

Term:	Attendance
Definition:	A process of recording and tracking the attendance of students in classes. Records indicating a student's presence or absence in scheduled classes.
Synonyms:	Presence Tracking Class Presence Record
Related Terms:	Attendance Monitoring (generalization)
Examples/ Counter-examples:	Automatically recording attendance when students scan QR code of attendance.

Table 48: Academic Record

Term:	Academic Record
Definition:	Student data related to grades, subjects, and course progress.
Synonyms:	Student Transcript
Related Terms:	Grade Report, Subject Enrollment (specialization)
Examples/ Counter-examples:	A student's academic record shows grades for each semester

Table 49: SMS Gateway

Term:	SMS Gateway
Definition:	A service that enables a computer to send or receive Short Message Service (SMS) transmissions to or from a telecommunications network.
Synonyms:	Text Messaging Interface
Related Terms:	Bulk SMS Service (specialization)
Examples/ Counter-examples:	Sending an alert message to students via SMS Gateway

Table 50: User Role (Role-Based Access)

Term:	User Role (Role-Based Access)
Definition:	A predefined access level that determines what a user can see or do in the system.
Synonyms:	Access Permission
Related Terms:	Admin, Lecturer, Student (specializations)
Examples/ Counter-examples:	Student role can view grades; Admin role can manage users

Table 51: System Issue Report

Term:	System Issue Report
Definition:	A form submitted by users to report errors or problems within the system.
Synonyms:	Bug Report
Related Terms:	Support Ticket (specialization)

Examples/ Counter-examples:	Student submits a report about login failure

Table 52: Admin Panel

Term:	Admin Panel
Definition:	Administrative interface used for managing users, settings, reports, and notifications.
Synonyms:	Admin Dashboard
Related Terms:	User Management System (specialization)
Examples/ Counter-examples:	Admin uses the panel to assign roles and view access logs