FACULTY OF COMPUTING AND INFORMATICS

CSE6224 – SOFTWARE REQUIREMENTS ENG

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

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1.0 Introduction

1.1 Purpose

The purpose of myMMU, the University Communication and Services Portal, is to serve as a centralized digital platform that streamlines communication and provides seamless access to academic and administrative services for the MMU community. By integrating with the Campus Management System and SMS Gateway, myMMU ensures that essential updates and academic information are delivered efficiently and effectively to students, lecturers, administrators, and parents.

At its core, myMMU is designed to enhance transparency, promote user engagement, and modernize institutional processes. Through this portal, students can view their academic performance, attendance records, financial statements, and important announcements. Parents are also kept informed with real-time SMS notifications about their child's academic progress, fee reminders, and attendance alerts, enabling stronger parental involvement and support.

Additionally, lecturers and administrators benefit from streamlined workflows and direct communication channels, allowing them to focus more on delivering quality education and managing operations effectively. With its user-friendly interface and mobile accessibility, myMMU provides a consistent and inclusive digital experience for all stakeholders.

Ultimately, myMMU aims to bridge communication gaps, reduce administrative burden, and foster a more connected and responsive university environment. By embracing technological integration and real-time data sharing, this initiative marks a significant step forward in MMU's digital transformation journey.

1.2 Scope

The myMMU University Communication and Services Portal will be a dynamic and centralized platform that connects students, lecturers, administrators, and parents within the MMU ecosystem. This platform is designed to provide secure access to academic records, attendance, billing information, announcements, and timely updates, while integrating with the university's existing Campus Management System (CMS) and SMS Gateway.

At its core, myMMU will offer essential features to ensure that users can easily access and interact with academic and administrative services. Students will be able to view their academic performance, fee payment status, attendance records, and announcements in one place. Parents will receive SMS alerts on their children's academic performance, absenteeism, and outstanding fees, promoting transparency and enabling better parental involvement.

Lecturers will be able to send announcements, monitor student attendance, and review academic progress, all through a simplified interface. Administrators will manage system configurations, broadcast campus-wide announcements, and ensure that the integration with the CMS and SMS Gateway runs smoothly.

To maintain an efficient and responsive service, myMMU will feature a modular design that supports future scalability, including multi-language support, theme personalization, and additional integrations (e.g., parking sticker services or timetable check-ins). The platform will also emphasize accessibility and responsiveness across desktop and mobile devices, ensuring a seamless experience for all users.

Furthermore, the system includes critical functions such as user authentication, role-based access control, SMS configuration, and secure data retrieval. These features ensure that myMMU not only meets core functional requirements but also satisfies institutional needs for data integrity, privacy, and real-time service delivery.

Table 1.2.1: Scope of Functions by User Role in myMMU Portal

User	Function
Student	1. Check attendance Records 2. View billing info and payment status 3. Receive announcements and SMS alerts 4. Access timetable and course info
Parent	1. Receive SMS alerts (low attendance, fee reminders, academic results)

	2. View child's grades, attendance, billing info
Lecturer	1. Post announcements and assignments 2. Upload materials 3. Update student's attendance and grades
Admin	1. Post university-wide notifications 2. Approve classroom bookings

In conclusion, myMMU aims to redefine communication and service access within MMU by combining automation, transparency, and user-centric design. Its scope spans across academic, financial, and administrative domains, supporting the university's digital transformation strategy and enhancing engagement among all stakeholders.

1.3 Product Overview

The myMMU University Communication and Services Portal is integrated with the university's Campus Management System and SMS Gateway, allowing students to access academic results, attendance records, billing information, and timetables. It also enables lecturers to submit grades and announcements, administrators to manage classroom bookings and inquiries, and parents to receive SMS alerts related to their child's academic performance and financial obligations.

1.3.1 Product Perspective

The myMMU University Communication and Services Portal is a centralized digital platform developed to enhance the academic and administrative experience for students, parents, lecturers, and university administrators. The system will be deployed on secure university-hosted infrastructure and will integrate directly with the Campus Management System (CMS) and an SMS Gateway, providing real-time access to essential information and direct mobile communication.

The myMMU system functions as an extension of the university's digital ecosystem, consolidating various services—such as academic performance tracking, attendance management, billing, and announcements—into one user-friendly interface. Each user role is provided with tailored access to relevant features, ensuring a secure, role-based experience.

The platform will be accessible through modern web browsers on desktop and mobile devices, promoting ease of access and usability. Students can retrieve personalized academic data and book classrooms, while parents receive timely SMS updates on their child's academic status and financial obligations. Lecturers can push announcements, submit grades, and manage assessments. Administrators will oversee platform configuration, handle booking approvals, and broadcast campus-wide notifications.

To ensure performance and scalability, the system architecture includes:

1. A Web Server for handling user requests and interfaces.
2. A Database Server for storing academic, billing, and attendance data.
3. Secure integration with the Campus Management System for data synchronization.
4. A connection to the SMS Gateway for outbound alerts and reminders.
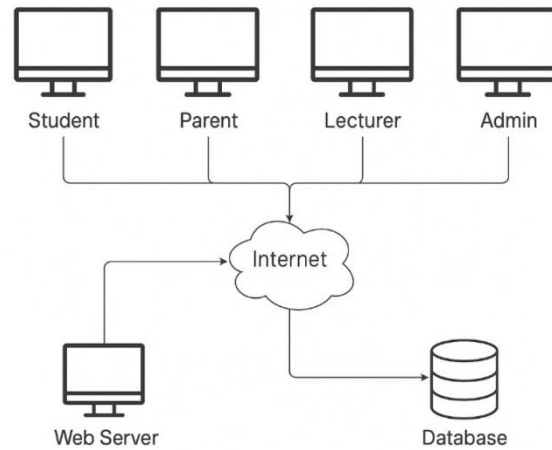
Figure 1.3.1 System Overview Diagram

The integration with the CMS ensures that academic records and billing data are always up to date, while the SMS Gateway guarantees that critical messages reach recipients in real time. This design supports the university's goals of digital transformation, transparent communication, and academic excellence by offering a holistic and modern service platform.
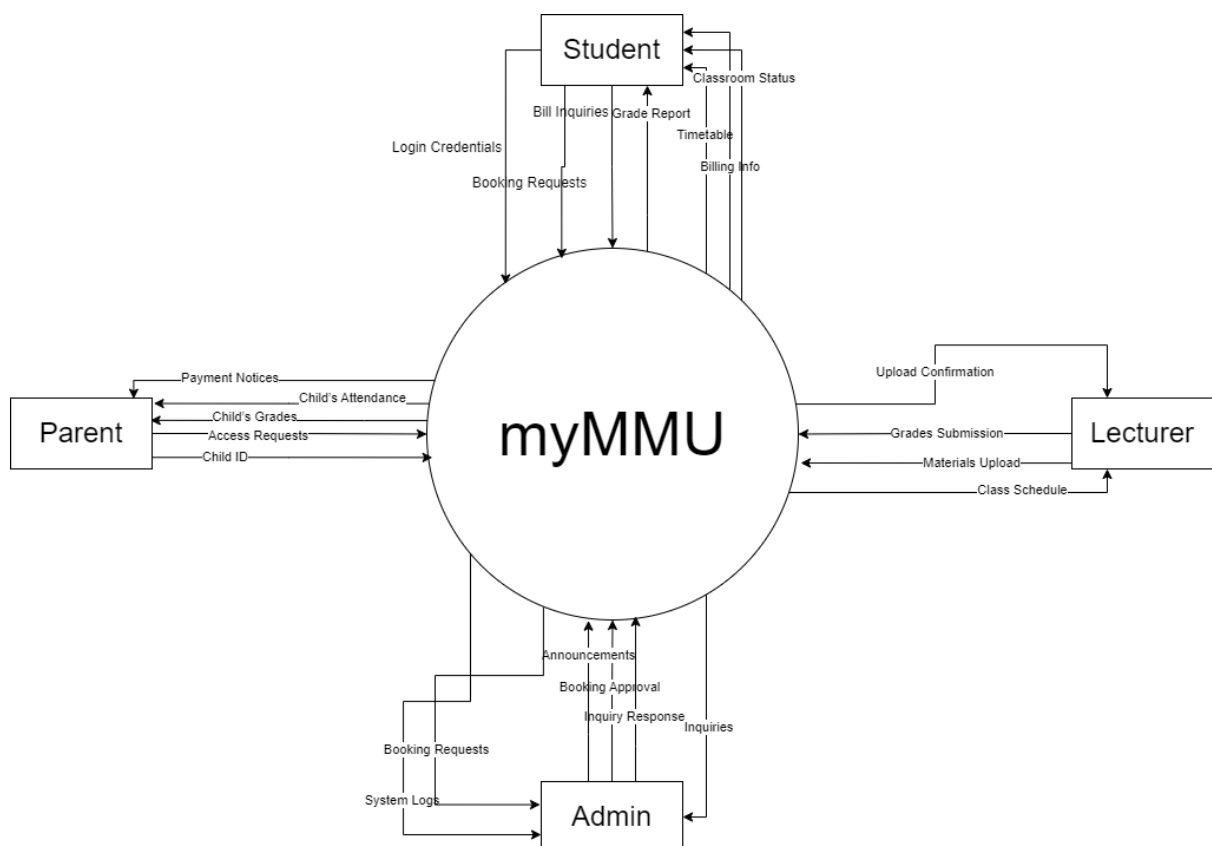
Figure 1.3.2 System Context Diagram

1.3.1.1 System Interface

myMMU connects directly to:

- Campus Management System (CMS) for retrieving academic results, billing information, attendance, and timetable data.
- SMS Gateway to deliver notifications such as low attendance alerts, fee reminders, and performance summaries to users.
- Internal MMU authentication systems for credential validation and session handling.

1.3.1.2 User Interface

The portal provides:

- A responsive web interface for desktops, tablets, and smartphones.
- Role-based dashboards (Student, Parent, Lecturer, Admin).
- A simple, accessible layout with icons, labels, and tables for data display and interaction.
- Language support: English (default), with potential for multi-language extension.

1.3.1.3 Hardware Interface

- Client Devices: Any modern device with internet access (PCs, laptops, tablets, smartphones).
- Server Infrastructure: University-hosted or cloud-based servers that store and manage data, API connections, and file storage.
- Compatible with USB card readers or biometric login in the future (optional).

1.3.1.4 Software Interface

- Built using Laravel/PHP or Django/Python for the backend.
- Relies on RESTful APIs to communicate with CMS and SMS services.
- Uses MySQL/PostgreSQL for database storage.
- Browser Compatibility: Latest versions of Chrome, Firefox, Edge, and Safari.

1.3.1.5 Communication Interface

❖ All communication between the client and server occurs over HTTPS.
❖ Internal API communication uses JSON over REST.
❖ SMS alerts are triggered via a secure gateway with OTP/token-based authentication.

1.3.1.6 Memory Constraints

✓ Minimal client-side memory usage as the application runs in-browser.
✓ Server specifications:
  ➢ Minimum 4GB RAM (test/development)
  ➢ Recommended 8GB+ RAM with scalable cloud storage for production

1.3.1.7 Operation

• The system is operational 24/7, except during planned maintenance.
• Role-based access ensures that users only interact with relevant modules.
• Real-time data updates are ensured through scheduled syncing with CMS.

1.3.1.8 Site Adaptation

o The system can be rebranded for different university branches (logo, colors, tagline).
o Configurable time zone, academic calendar, and localization.
o Scalable for future modules (e.g., club management, wellness tracking).

1.3.1.9 Interface with Services

myMMU interfaces with:

▪ Campus Management System: Academic records, fees, timetable, and attendance.
▪ SMS Gateway: For outbound communication.
▪ Authentication Service: For secure login and session management.
▪ Optional: Email server or notification system for email alerts.

1.3.2 Product Function

This is the overall use case diagram that shows all use cases for all actors.

Figure 1.3.2: Use Case Diagram of myMMU University Communication and Services Portal
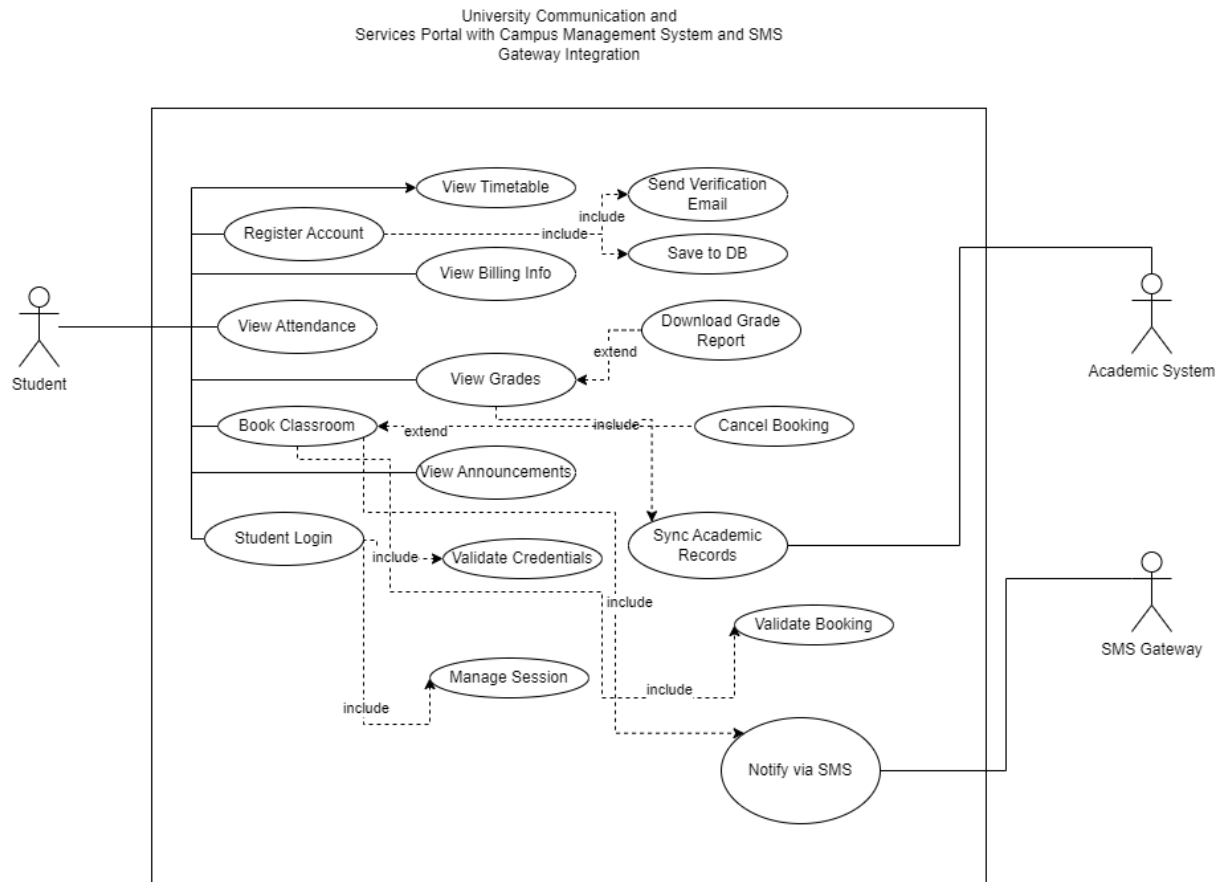
1.3.2.1 Student

Figure 1.3.2.1: Use Case Diagram of Actor (Student)

Table 1.3.2.1: Use Case Table of Actor (Student)

Use Case ID	Use Case Name	Description	Author
REQ_STD001	Student Login	Allows a student to log into the system using valid credentials.	Tey Jun Cheng
REQ_STD002	Register Account	Enables new users to register and create a student account.	Tey Jun Cheng
REQ_STD003	View Grades	Allows students to view their academic results and download reports.	Tey Jun Cheng
REQ_STD004	View Attendance	Enables students to check their attendance records.	Tey Jun Cheng
REQ_STD005	View Timetable	Allows students to access their academic schedule.	Tey Jun Cheng
REQ_STD006	View Billing Info	Enables students to check outstanding fees and payment history.	Tey Jun Cheng
REQ_STD007	Book Classroom	Allows students to reserve a classroom based on availability.	Tey Jun Cheng
REQ_STD008	View Announcements	Enables students to view announcements posted by lecturers or admins.	Tey Jun Cheng
REQ_STD009	Download Grade Report	Allows students to download a detailed grade report.	Tey Jun Cheng
REQ_STD010	Cancel Booking	Permits students to cancel a previously booked classroom.	Tey Jun Cheng
REQ_STD011	Notify via SMS	Sends SMS notifications regarding fees, attendance, or grades. *(integrated with SMS Gateway)*	Tey Jun Cheng

1.3.2.2 Lecturer

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Gateway Integration

Figure 1.3.2.2: Use Case Diagram of Actor (Lecturer)

Table 1.3.2.2: Use Case Diagram of Actor (Lecturer)

Use Case ID	Use Case Name	Description	Author
REQ_LEC001	Lecturer Login	Allows lecturers to log into the system securely using their credentials.	Tey Jun Cheng
REQ_LEC002	Upload Materials	Enables lecturers to upload lecture notes, slides, and supporting documents for students.	Tey Jun Cheng
REQ_LEC003	Submit Grades	Allows lecturers to input and submit students' academic results.	Tey Jun Cheng
REQ_LEC004	Send Announcements	Enables lecturers to broadcast announcements to their respective classes.	Tey Jun Cheng
REQ_LEC005	Schedule Assessment	Allows lecturers to set and manage assessment dates for assignments, quizzes, or exams.	Tey Jun Cheng

1.3.2.3 Admin

Figure 1.3.2.3: Use Case Diagram of Actor (Admin)

Table 1.3.2.3: Use Case Diagram of Actor (Admin)

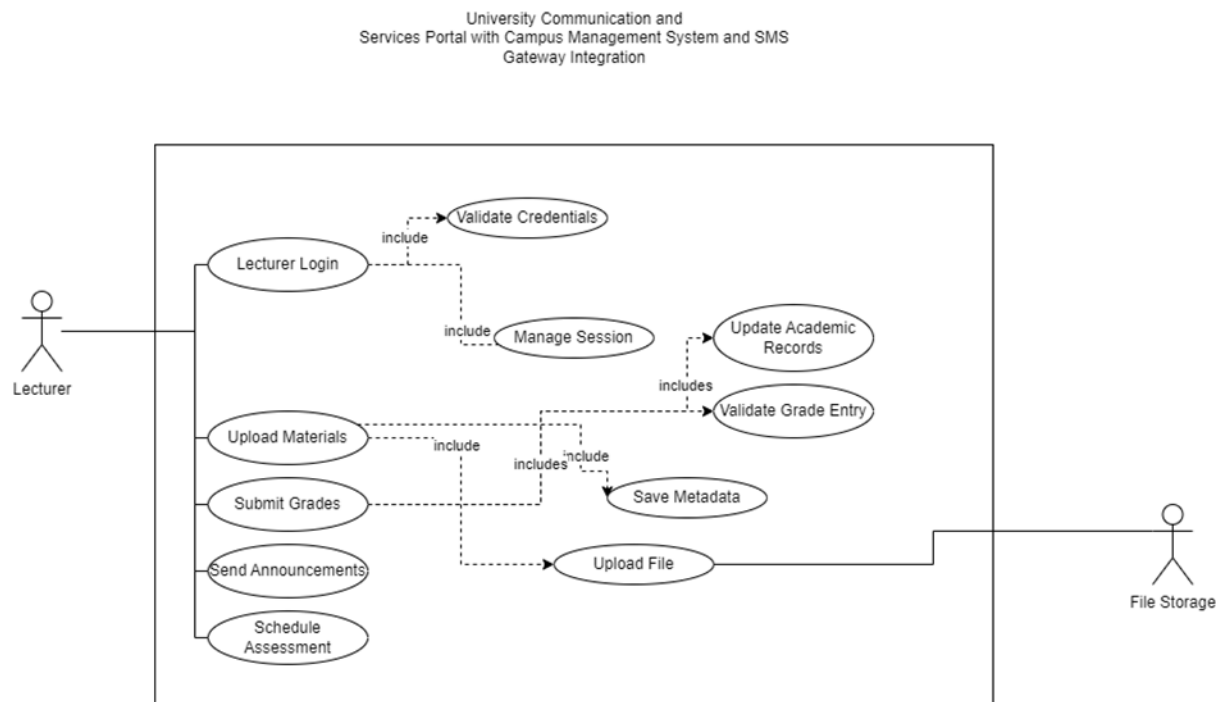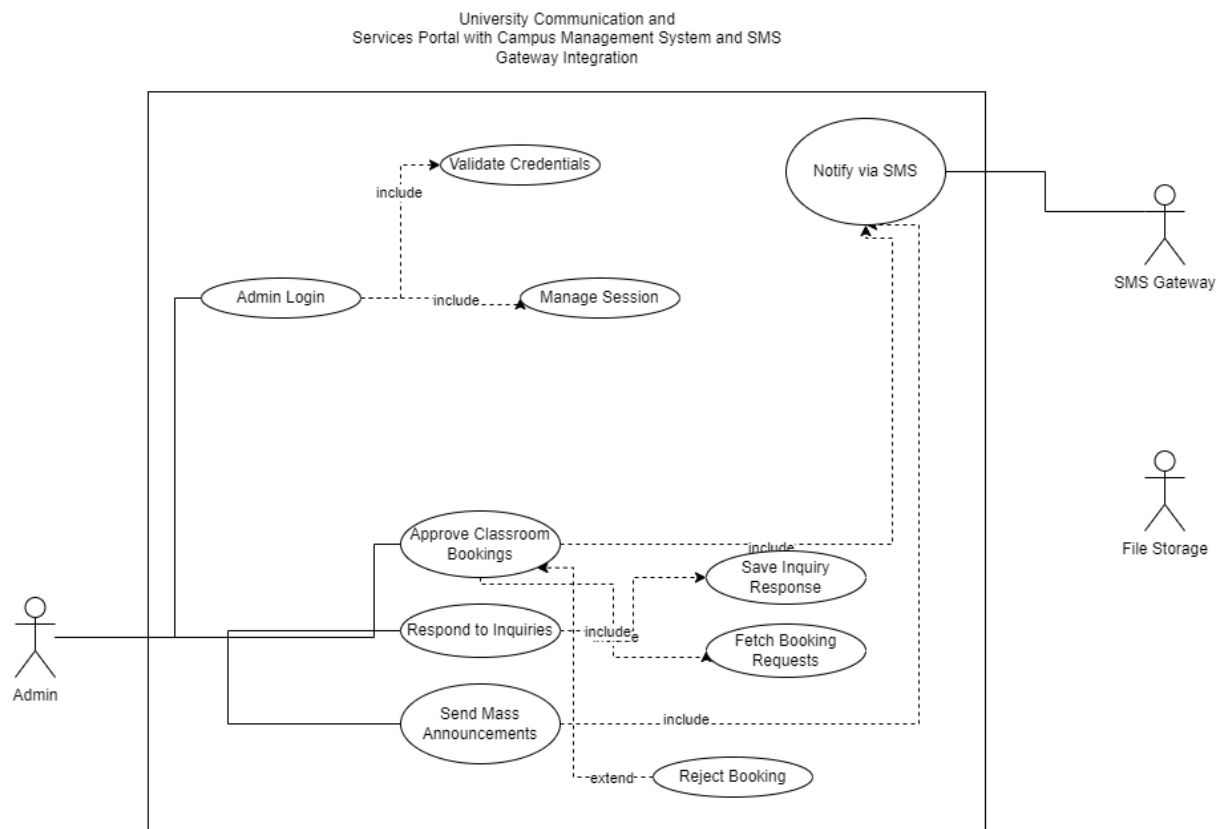| Use Case ID	Use Case Name	Description	Author
REQ_ADM001	Admin Login	Allows administrators to securely log into the system using verified credentials.	Tey Jun Cheng
REQ_ADM002	Approve Classroom Bookings	Enables administrators to review and approve student classroom booking requests.	Tey Jun Cheng
REQ_ADM003	Respond to Inquiries	Allows administrators to reply to user-submitted questions or service-related concerns.	Tey Jun Cheng
REQ_ADM004	Send Mass Announcements	Enables administrators to broadcast announcements campus-wide to all user groups.	Tey Jun Cheng

1.3.2.4 Parent
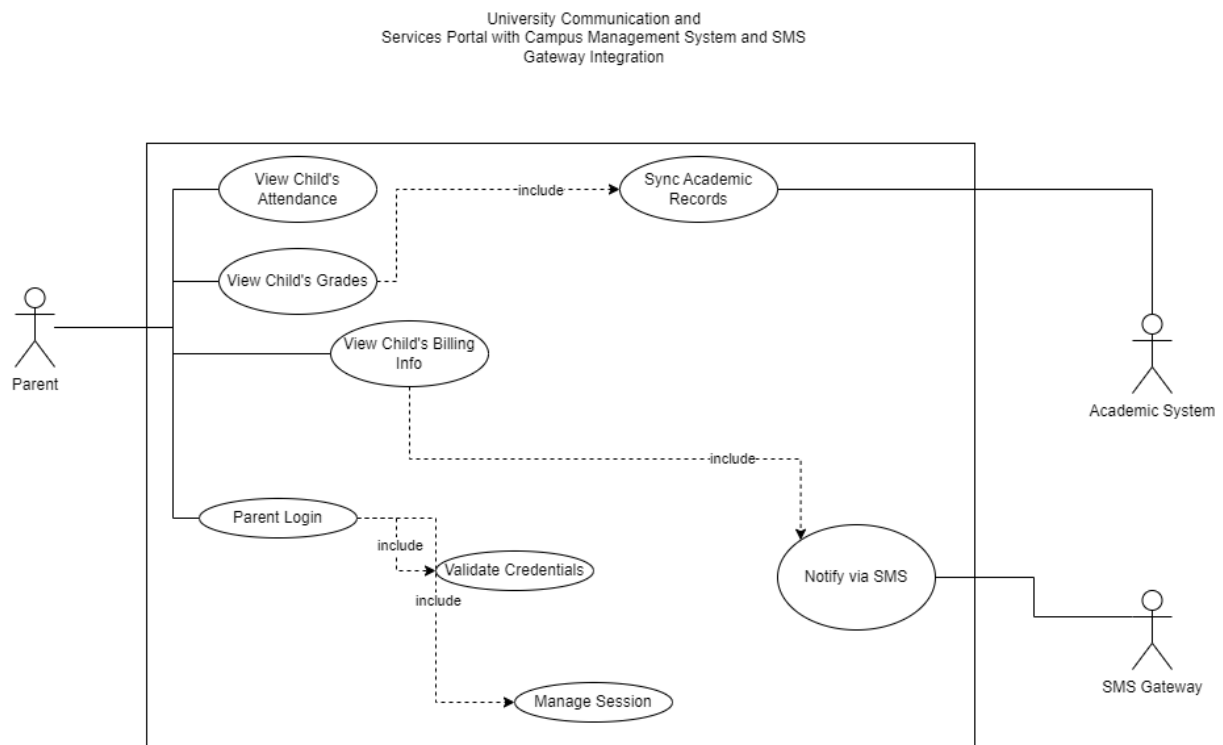
Figure 1.3.2.4: Use Case Diagram of Actor (Parent)

Table 1.3.2.4: Use Case Diagram of Actor (Parent)

Use Case ID	Use Case Name	Description	Author
REQ_PAR001	Parent Login	Allows parents to securely log into the portal using their credentials.	Tey Jun Cheng
REQ_PAR002	View Child's Grades	Enables parents to access and review their child's academic performance.	Tey Jun Cheng
REQ_PAR003	View Child's Attendance	Allows parents to monitor their child's attendance records.	Tey Jun Cheng
REQ_PAR004	View Child's Billing Info	Permits parents to view their child's outstanding fees and payment status.	Tey Jun Cheng

1.3.3 User Characteristics

This section outlines the characteristics of each intended user group in the myMMU portal. It includes the users' roles, expected familiarity with technology, and the level of system interaction. Understanding these traits helps guide interface design, user onboarding, and support strategy.

Table 1.3.3: User Characteristics of myMMU System

Role	Description	Status	Technical Expertise / Expected Knowledge
Student	Current students enrolled in the university using the portal for academic and service access.	User Privilege	Basic to moderate understanding of online portals, ability to check academic data, and perform transactions.
Parent	Guardians or parents who monitor their child's academic and financial status.	User Privilege	Basic mobile usage, familiar with SMS and simple dashboard interfaces.
Lecturer	Teaching staff who submit results, upload materials, and communicate with students.	User Privilege	Moderate understanding of system tools like grade entry, document upload, and class-wide messaging.
Admin	University staff responsible for managing bookings, inquiries, and announcements.	Developer Privilege	Advanced system knowledge, administrative dashboard handling, and SMS broadcast or approval workflows.

1.3.4 Limitation

The development and deployment of the myMMU University Communication and Services Portal come with several limitations that could affect its functionality, user experience, and maintainability. These limitations arise from technical constraints, integration dependencies, user behavior, and resource availability.

1. Hardware Limitations

The system's performance may vary depending on the university's existing server infrastructure and client devices used by end-users. Outdated hardware on either side may result in slower processing times, delayed data synchronization with the Campus Management System (CMS), or degraded user experience.

2. Integration Dependencies

myMMU depends heavily on its integration with external systems such as the CMS and the SMS Gateway. Any changes, downtime, or API limitations from these external systems could directly affect the portal's functionality, requiring frequent updates or workaround implementations.

3. Security and Privacy Constraints

Ensuring the protection of academic and financial data is critical. The system must comply with university policies and data protection regulations. Failure to implement robust authentication, encryption, and access control measures could lead to data breaches, loss of trust, and system vulnerabilities.

4. User Adoption and Technological Familiarity

The portal's effectiveness depends on its active usage by students, parents, lecturers, and administrators. Low user awareness, resistance to adopting new platforms, or unfamiliarity with system navigation could hinder engagement and reduce the system's impact.

5. Customization and Scalability

While the portal is designed to be modular, certain university-specific features may not be easily customizable due to platform architecture constraints. Adapting the system to evolving university needs or expanding it to other campuses may require significant redevelopment.

6. Budget and Resource Constraints

The development, deployment, and maintenance of myMMU must operate within the university's budget. Limited financial or human resources may restrict the implementation of advanced features, multilingual support, or real-time analytics, impacting the system's growth and sustainability.

1.3.5 Apportioning of Requirements

The apportioning of requirements for the myMMU University Communication and Services Portal categorizes the system into key functional modules. Each module targets a specific aspect of the portal's core features, ensuring that stakeholder needs are met efficiently through structured development. The following table outlines the requirement allocation across major system modules:

Table 1.3.5: Apportioning of Requirements

Module ID	Module Name	Description
REQ_MMU001	User Management	Handles account registration, login, authentication, session handling, and role-based access control.
REQ_MMU002	Academic Records Module	Manages retrieval and display of grades, attendance, timetable, and billing information via CMS.
REQ_MMU003	Classroom Booking	Allows students to submit booking requests; enables admins to approve, reject, or cancel bookings.
REQ_MMU004	Announcement Module	Supports lecturers and admins in creating and broadcasting announcements to students.
REQ_MMU005	SMS Notification System	Sends real-time SMS alerts to parents and students on performance, attendance, or fee updates.
REQ_MMU006	Data Sync and Integration	Handles integration with the Campus Management System and SMS Gateway for syncing academic data.

1.4 Definition

Below are important terms used in the myMMU Software Requirements Specification (SRS), along with their respective definitions.

Table 1.4: Terms and Definitions

Term	Definition
myMMU	A centralized portal for university communication and academic/administrative services.
User	Any individual who uses the system, including students, parents, lecturers, and administrators.
Student	A current MMU student who can access personal academic and financial data via the portal.
Parent	A guardian or parent who receives updates on the student's academic progress and fee status.
Lecturer	University staff responsible for managing classes, assessments, grades, and announcements.
Administrator	A user with system-level privileges to manage bookings, respond to inquiries, and send alerts.
Campus Management System (CMS)	The university's existing back-end system storing academic, billing, and attendance data.
SMS Gateway	An external service used to send real-time SMS alerts to parents and students.
Dashboard	A personalized user interface displaying relevant modules based on the user's role.
Authentication	The login process where users provide credentials to access the system securely.

2.0 Reference

Mikulić, J. and Prebežac, D. (2011), "A critical review of techniques for classifying quality attributes in the Kano model", Managing Service Quality: An International Journal, Vol. 21 No. 1, pp. 46-66. https://doi.org/10.1108/09604521111100243

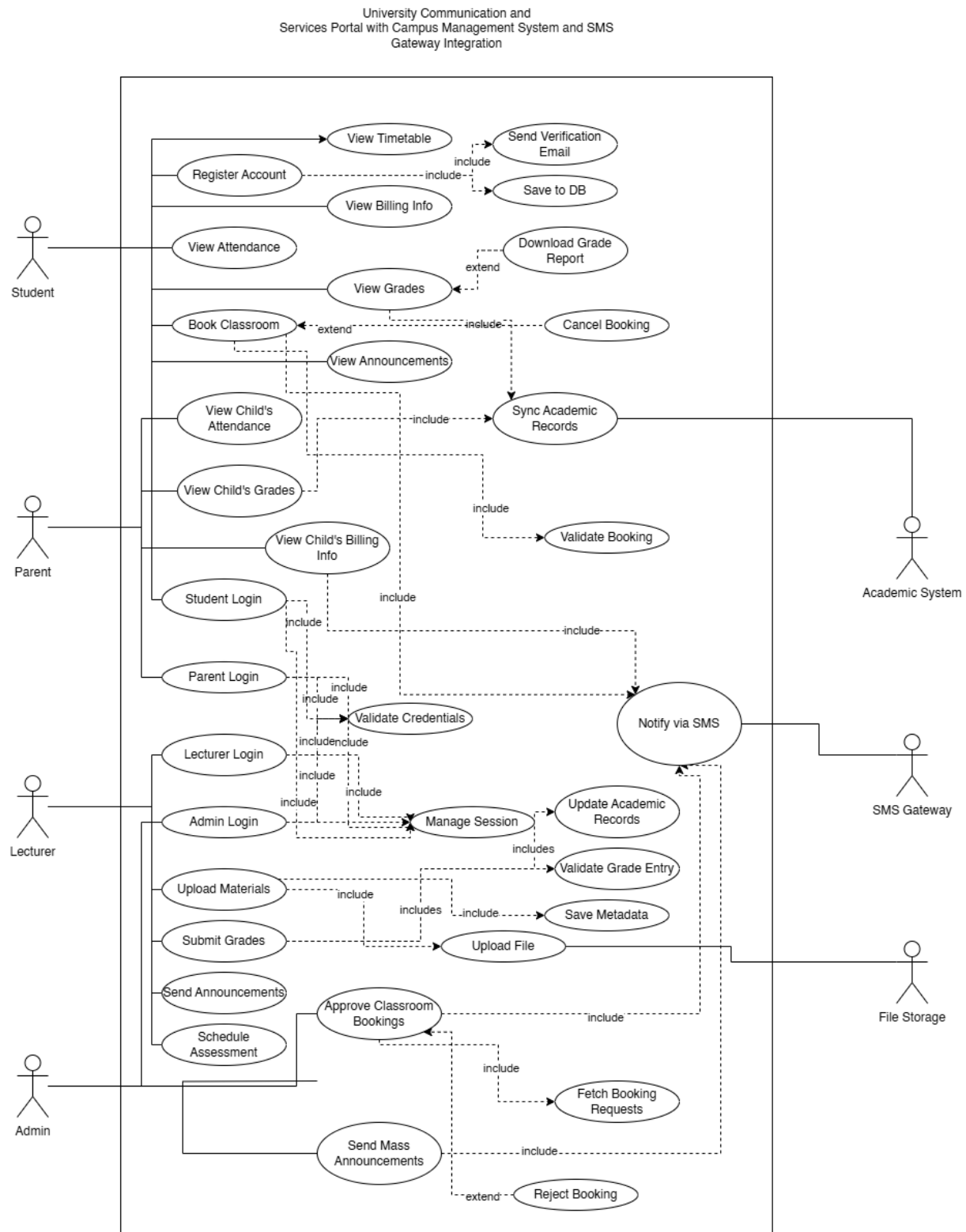IEEE. (2018). ISO/IEC/IEEE 29148:2018 Systems and software engineering—Life cycle processes—Requirements engineering. https://www.iso.org/standard/72089.html

3.0 Requirement

3.1 Functions

Figure 3.1: Use Case Diagram

3.1.1 Login

Table 3.1.1: User login use case specification table

| ID	F-001
Feature	Login
Version	1.0
Purpose	To allow students, parents, lecturers, and admins to securely log in to the myMMU portal and access relevant services.
Actor(s)	Student, Parent, Lecturer, Admin
Precondition	User must have a valid user ID and password.
Postcondition	User will be authenticated and redirected to their respective dashboard based on role.
Main Flow	1. Actor navigates to Login Page 2. System displays Login Page 3. Actor enters user ID and password 4. System verifies credentials 5. System authenticates user and starts session 6. System redirects actor to respective dashboard
Alternate Scenario	1. If credentials are invalid, system shows error message and asks for re-entry 2. If fields are empty, system displays error prompting for all required fields
Author	Yang Jia En
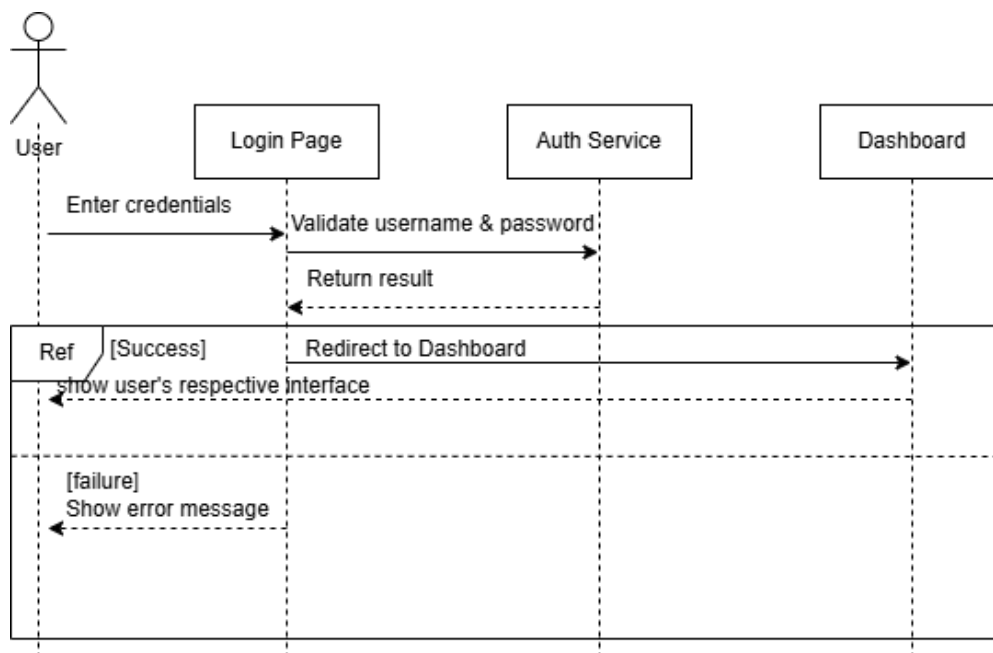
Figure 3.1.1.1: User login sequence diagram
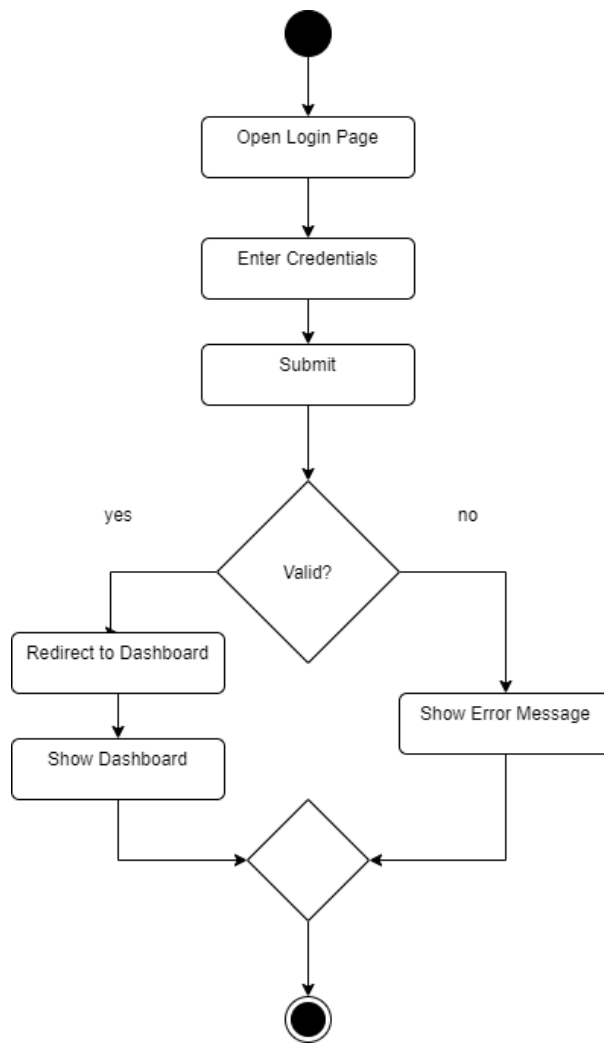
Figure 3.1.1.2: User login activity diagram

3.1.2 View Grades

Table 3.1.2: User view grades use case specification table

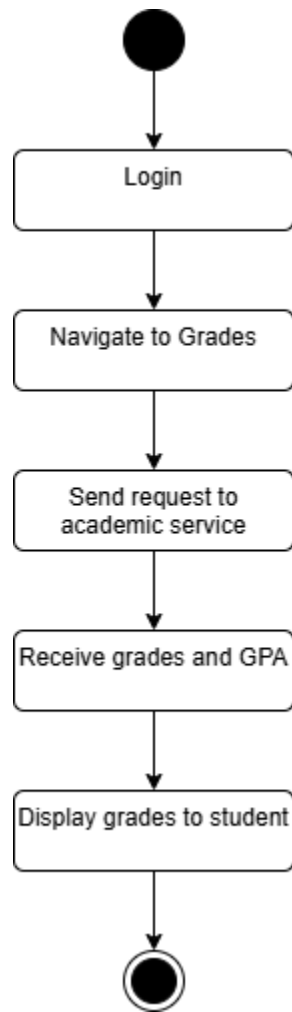| ID	F-002
Feature	View Grades
Version	1.1
Purpose	To allow users to view a student's academic performance retrieved from the university CMS.
Actor(s)	Student, Parent, Admin
Precondition	Actor must be logged in and have valid permissions.
Postcondition	Grades for the selected trimester or subject are displayed.
Main Flow	1. Actor navigates to "Grades" page 2. System requests grade data from CMS 3. System filters and formats data based on the actor's role 4. System displays grades in a readable format
Alternate Scenario	1. If CMS is unavailable, system shows "Unable to retrieve grades" 2. If student has no grades recorded, system shows "No grades available"
Author	Yang Jia En
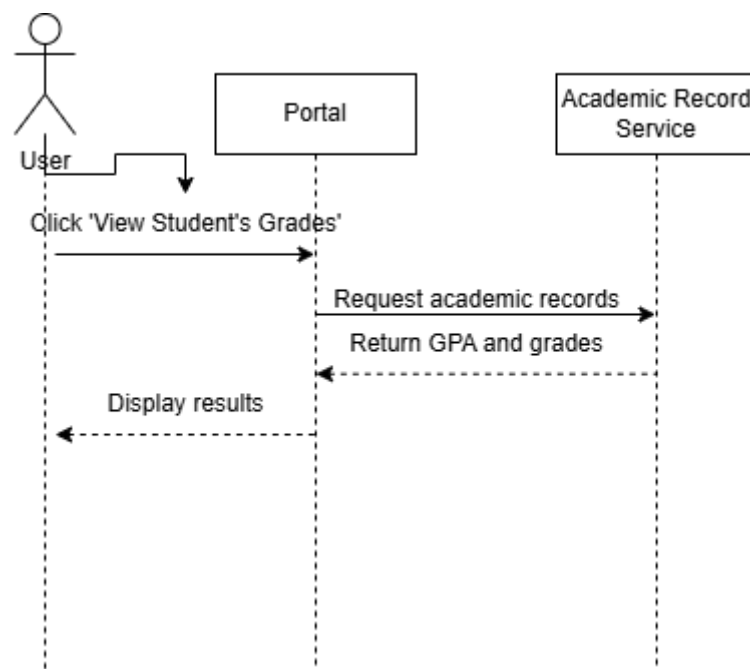
Figure 3.1.2.1: User view grades sequence diagram

Figure 3.1.2.1: User view grades activity diagram

3.1.3 View attendance (except Lecturer)

Table 3.1.3: User view attendance use case specification table

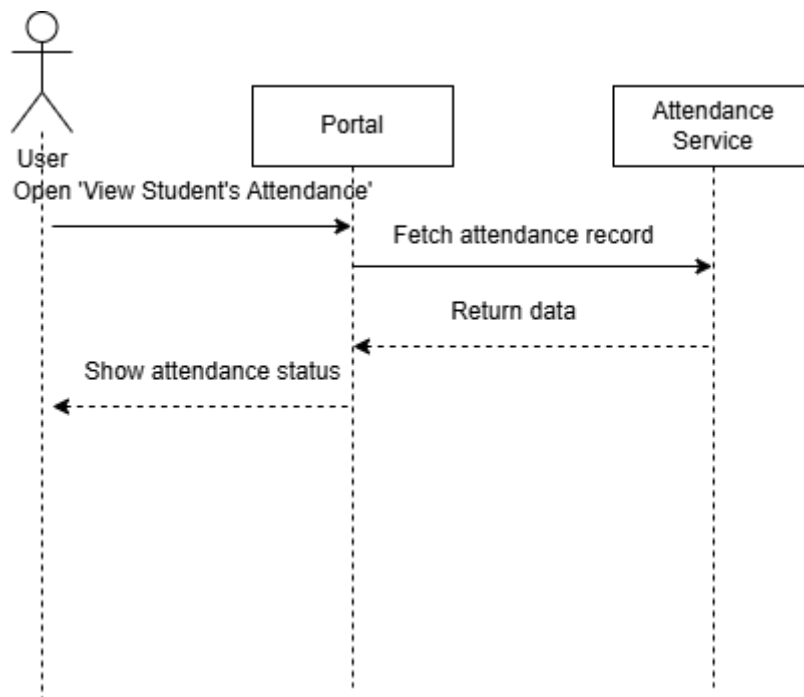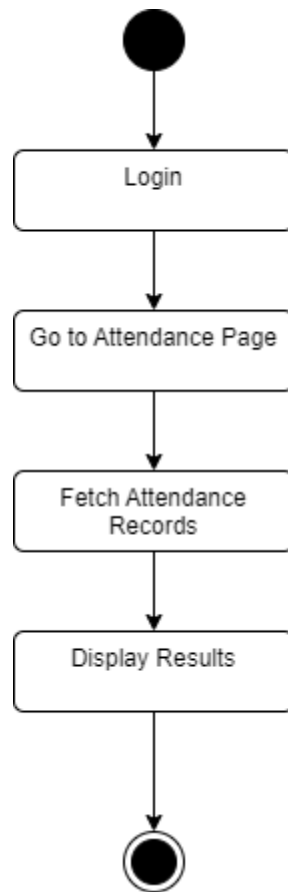| ID	F-003
Feature	View Attendance
Version	1.0
Purpose	To allow students, parents, and admins to view a student's attendance records retrieved from the university CMS.
Actor(s)	Student, Parent, Admin
Precondition	Actor must be logged in with appropriate permissions.
Postcondition	Attendance records are displayed for the selected subject and timeframe.
Main Flow	1. Actor navigates to "Attendance" page 2. System retrieves attendance data from CMS 3. System filters and formats the data 4. System displays attendance summary and details to the actor
Alternate Scenario	1. If CMS connection fails, system displays "Unable to fetch attendance data" 2. If no attendance records exist, system shows "No attendance available"
Author	Yang Jia En

Figure 3.1.3.1: User view attendance sequence diagram

Figure 3.1.3.2: User view attendance activity diagram

3.1.4 Student and Parent View Billing Info

Table 3.1.4: User View Billing Info Use Case Specification Table

| ID	F-004
Feature	View Billing Information
Version	1.0
Purpose	To allow students and parents to view the student's financial records, including outstanding fees, payment status, and history.
Actor(s)	Student, Parent
Precondition	Actor must be logged in with a valid session.
Postcondition	The billing summary and detailed breakdown are displayed.
Main Flow	1. Actor navigates to "Billing Info" page 2. System fetches billing data from CMS 3. System displays the summary of fees, due dates, and payment history
Alternate Scenario	1. If billing data is unavailable, system shows "Unable to retrieve billing information" 2. If no records exist, system shows "No billing records found"
Author	Yang Jia En
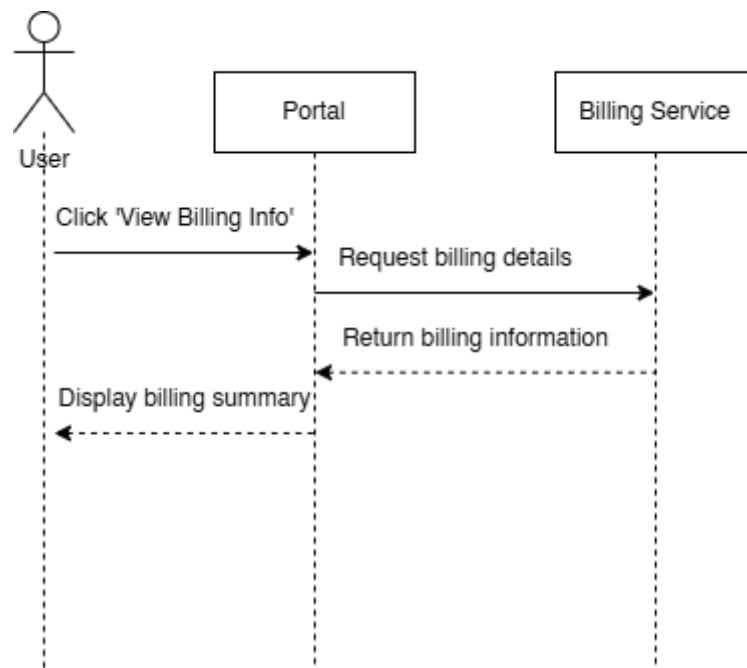
Figure 3.1.4.1: User view billing info sequence diagram
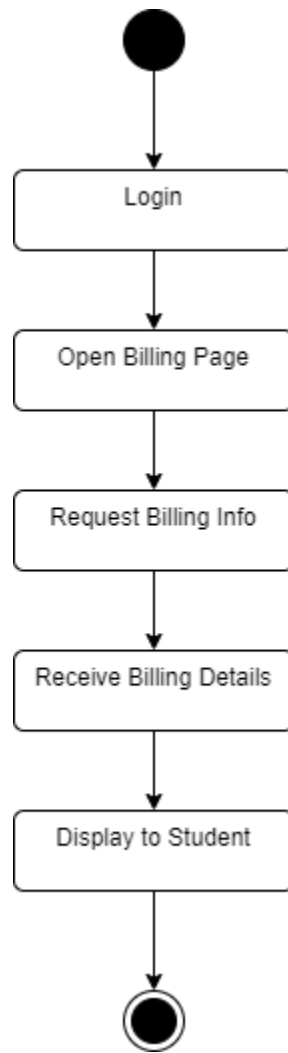
Figure 3.1.4.2: User view billing info activity diagram

3.1.5 Student View Timetable

Table 3.1.5: Student view timetable use case specification table

| ID	F-005
Feature	View Timetable
Version	1.0
Purpose	To allow students to view their class schedules based on the current or selected trimester, retrieved from the university's CMS.
Actor(s)	Student
Precondition	Student must be logged in with an active session.
Postcondition	Timetable is displayed based on selected filters (e.g., week, trimester).
Main Flow	1. Student selects "Timetable" tab 2. System fetches timetable data from CMS based on student ID and trimester 3. System formats timetable 4. System displays schedule in calendar/grid view
Alternate Scenario	1. If no timetable is available, system shows "No timetable data found" 2. If CMS fetch fails, system shows error and retry option
Author	Yang Jia En
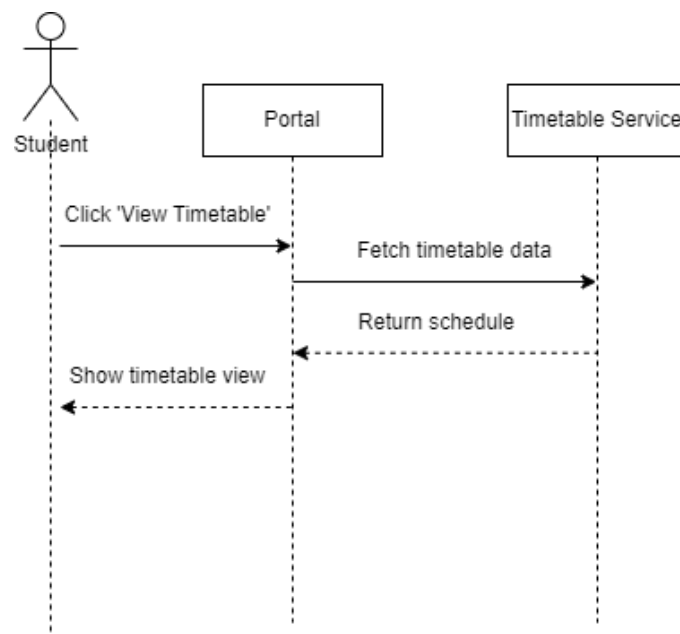
Figure 3.1.5.1: Student view timetable sequence diagram
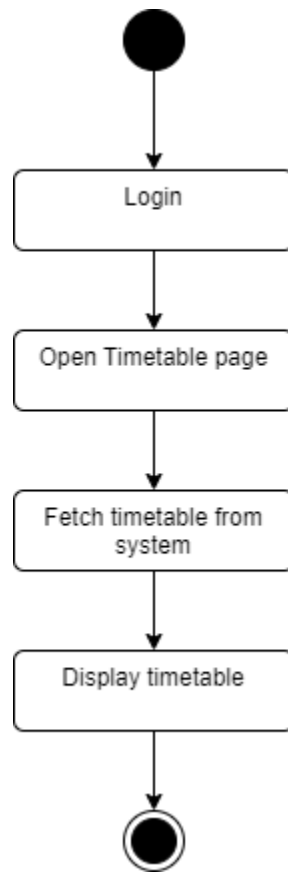
Figure 3.1.5.2: Student view timetable activity diagram

3.1.6 Student View Announcements

Table 3.1.6: Student view announcements use case specification table

| ID	F-006
Feature	View Announcements
Version	1.0
Purpose	To allow students to access official announcements such as academic notices, deadlines, events, or important updates.
Actor(s)	Student
Precondition	Student must be logged in with a valid session.
Postcondition	Relevant announcements are displayed to the student.
Main Flow	1. Student clicks on "Announcements" tab 2. System fetches announcements from database or CMS 3. System filters announcements based on category or target audience 4. System displays announcement list with preview 5. Student clicks an item to view full content
Alternate Scenario	1. If there are no announcements, system displays "No announcements available" 2. If retrieval fails, system shows "Unable to load announcements"
Author	Yang Jia En
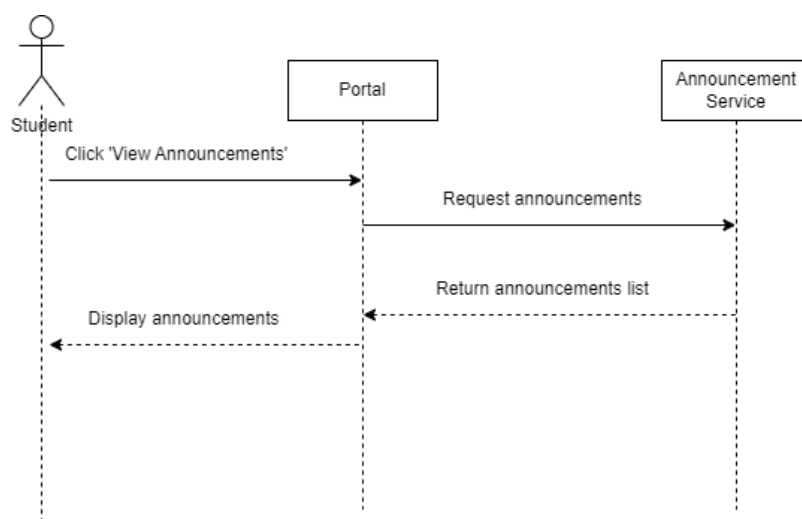
Figure 3.1.6.1: Student view announcements sequence diagram
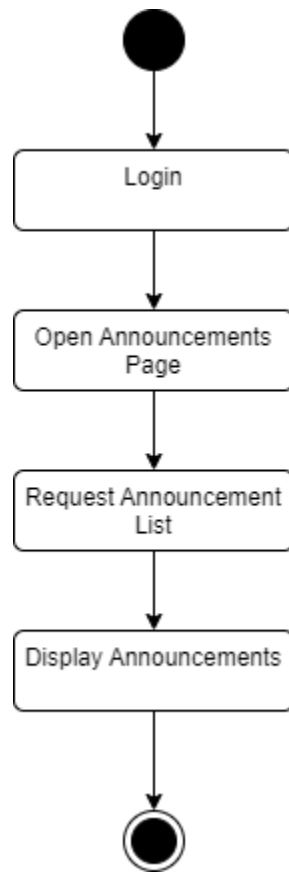
Figure 3.1.6.2: Student view announcements activity diagram

3.1.7 Student Book Classroom

Table 3.1.7: Student book classroom use case specification table

ID	F-007
Feature	Book Classroom
Version	1.0
Purpose	To allow students to submit a request to book a classroom for group study or project meetings.
Actor(s)	Student
Precondition	Student must be logged in with a valid session.
Postcondition	Booking request is submitted and pending admin approval.
Main Flow	1. Student navigates to "Book Classroom" page 2. Student selects date, time, and room 3. System validates availability 4. Student submits request 5. System records request and forwards to Admin for approval 6. System displays booking status as "Pending"
Alternate Scenario	1. If the room is unavailable, system prompts student to select another slot 2. If submission fails, system shows "Booking request failed. Please try again."
Author	Yang Jia En
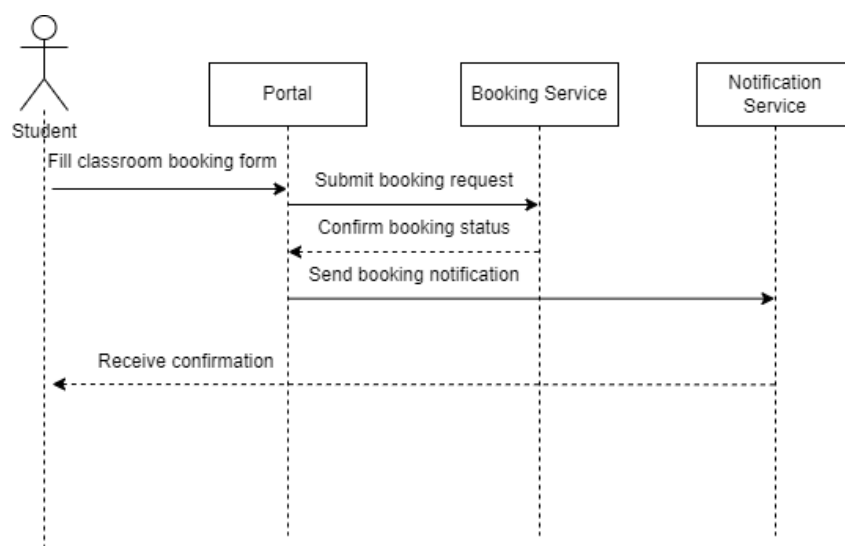
Figure 3.1.7.1: Student book classroom sequence diagram
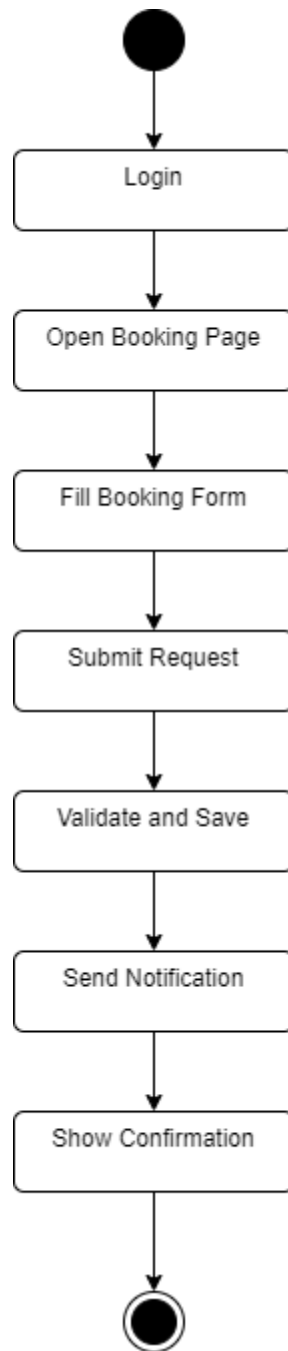
Figure 3.1.7.2: Student book classroom activity diagram

3.1.8 User Receive Notification

Table 3.1.8.1: User receive notification use case specification table

ID	F-008
Feature	Receive SMS Notification
Version	1.0
Purpose	To notify students and parents via SMS when key events occur, such as grade release, low attendance alerts, or unpaid fees.
Actor(s)	Student, Parent
Precondition	Actor has a valid phone number registered in the system.
Postcondition	Actor receives SMS with relevant content.
Main Flow	1. System detects triggering event (e.g., grade posted) 2. System checks notification rules 3. System composes SMS message 4. System sends SMS via integrated SMS Gateway 5. Actor receives SMS on mobile device
Alternate Scenario	1. If phone number is missing or invalid, system logs the failure 2. If SMS Gateway is unavailable, system queues or retries the message
Author	Yang Jia En
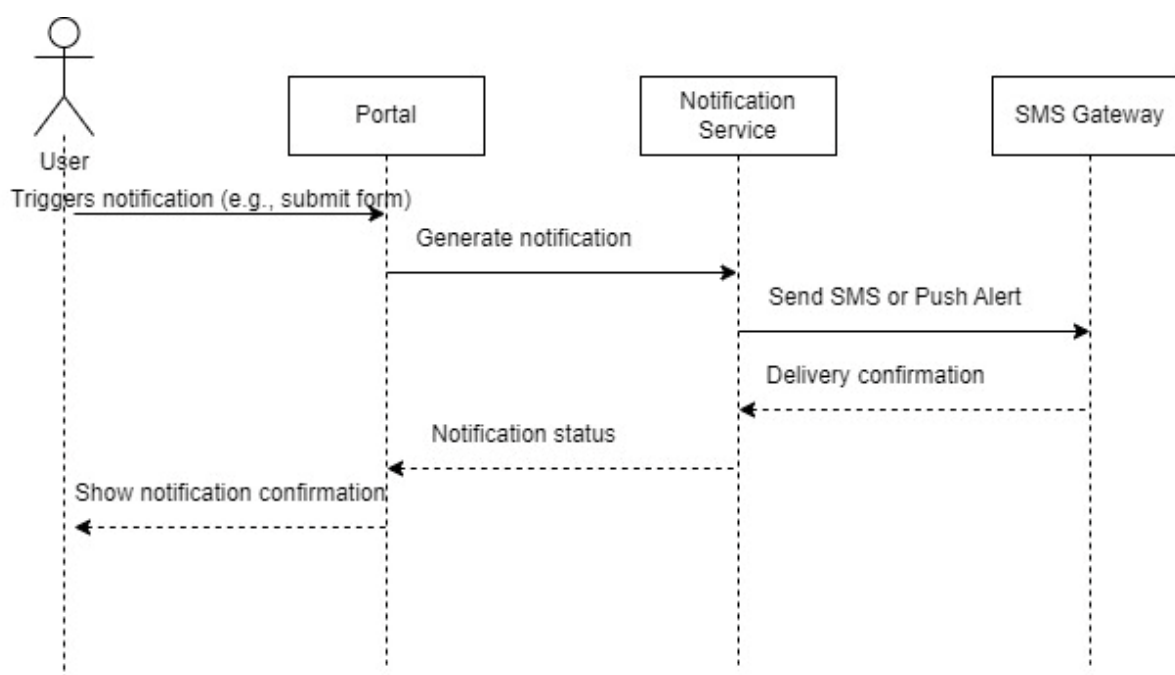
Figure 3.1.8.1: User receive notification sequence diagram
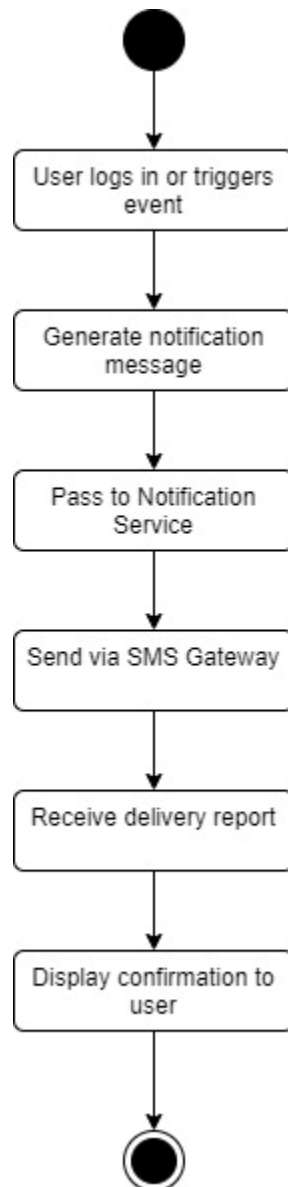
Figure 3.1.8.2: User receive notification sequence diagram

3.1.9 Lecturer Upload Materials

Table 3.1.9: Lecturer Upload Materials Use Case Specifications Table

ID	F-009
Feature	Upload Materials
Version	1.0
Purpose	To allow lecturers to upload learning materials such as slides, notes, or readings for students to access.
Actor(s)	Lecturer
Precondition	Lecturer must be logged in and assigned to a subject.
Postcondition	Materials are stored and made accessible to enrolled students.
Main Flow	1. Lecturer navigates to "Upload Materials" page 2. Lecturer selects subject and uploads file 3. System validates file type/size 4. System stores file in server or cloud storage 5 . System logs upload and displays confirmation
Alternate Scenario	1. If file is too large or invalid format, system rejects and prompts correction 2. If upload fails due to network/server issues, system shows "Upload failed, please try again"
Author	Yang Jia En
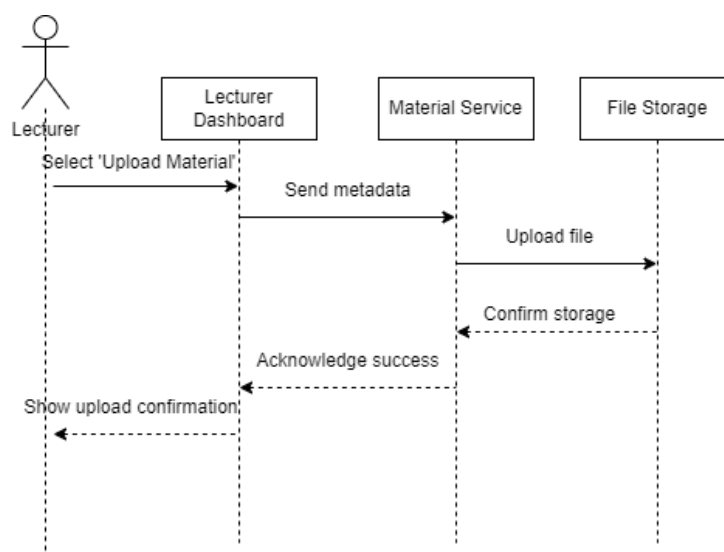
Figure 3.1.9.1: Lecturer upload materials sequence diagram
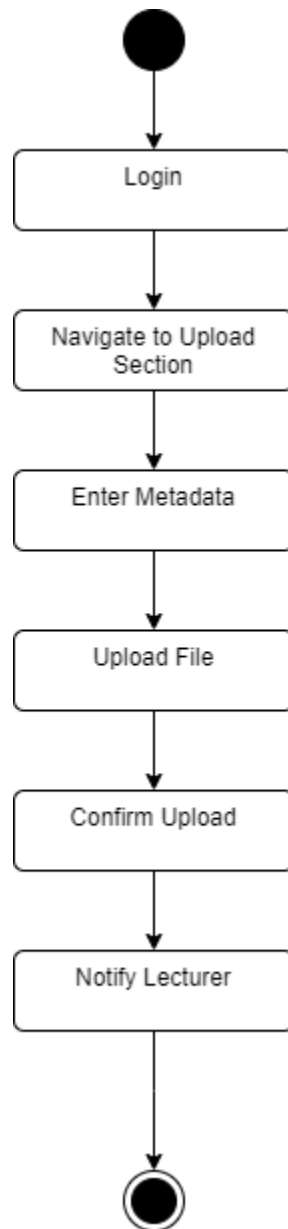
Figure 3.1.9.2: Lecturer upload materials activity diagram

3.1.10 Lecturer Submit Grades

Table 3.1.10: Lecturer Submit Grades Use Case Specifications Table

ID	F-010
Feature	Submit Grades
Version	1.0
Purpose	To allow lecturers to enter, update, and submit student grades for subjects they are teaching.
Actor(s)	Lecturer
Precondition	Lecturer must be logged in and assigned to the subject.
Postcondition	Student grades are stored in the system and synced with the academic records.
Main Flow	1. Lecturer navigates to "Submit Grades" page 2. Lecturer selects subject and trimester 3. Lecturer inputs or uploads grades for enrolled students 4. System validates input (e.g., valid range, complete fields) 5. System saves grades and confirms submission
Alternate Scenario	1. If invalid data is entered, system shows errors for correction 2. If submission fails (e.g., server or sync error), system shows retry prompt
Author	Yang Jia En
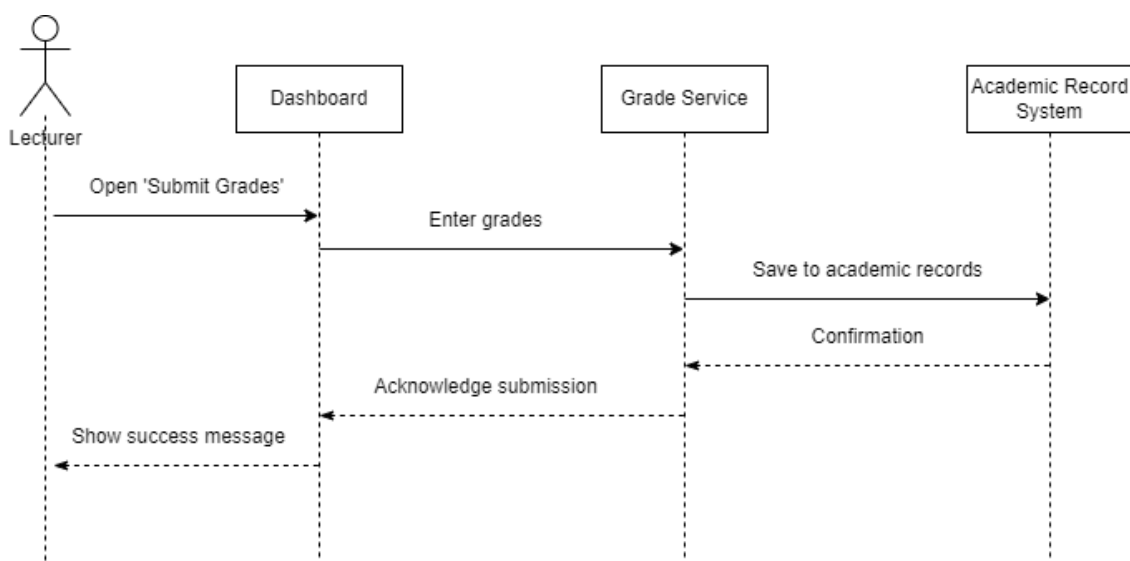
Figure 3.1.10.1: Lecturer submit grades sequence diagram
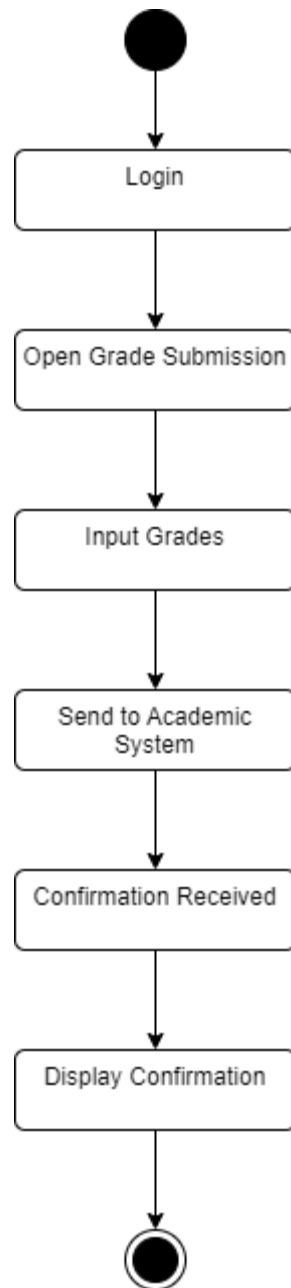
Figure 3.1.10.1: Lecturer submit grades activity diagram

3.1.11 Lecturer Send Announcements

Table 3.1.11: Lecturer send announcements use case specifications table

ID	F-011
Feature	Send Announcements
Version	1.0
Purpose	To allow lecturers to send academic announcements to students enrolled in their subjects.
Actor(s)	Lecturer
Precondition	Lecturer must be logged in and assigned to at least one subject.
Postcondition	Announcement is delivered to relevant students and stored in the system.
Main Flow	1. Lecturer navigates to "Send Announcements" 2. Lecturer selects subject and enters message 3. System validates content and target audience 4. System saves announcement and sends it to all enrolled students 5. Students see the announcement on their dashboards
Alternate Scenario	1. If message field is empty or too long, system prompts for correction 2. If submission fails due to server error, system shows "Unable to send announcement"
Author	Yang Jia En
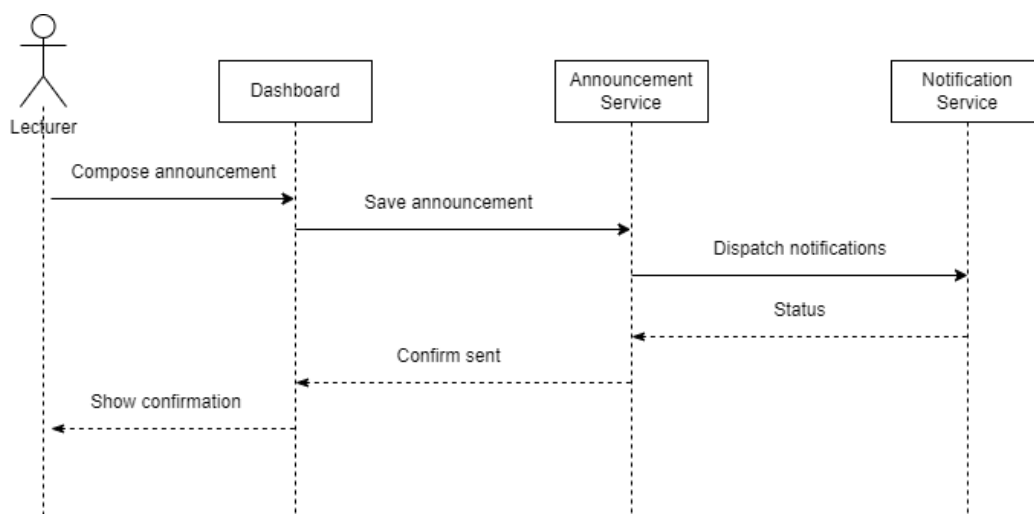
Figure 3.1.11.1: Lecturer send announcements sequence diagram
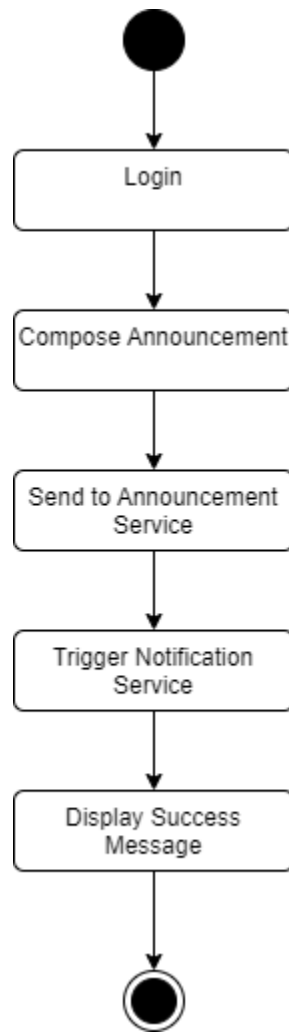
Figure 3.1.11.2: Lecturer send announcements activity diagram

3.1.12 Lecturer Schedule Assessment

Table 3.1.12: Lecturer schedule assessment use case specifications table

ID	F-012
Feature	Schedule Assessment
Version	1.0
Purpose	To allow lecturers to schedule upcoming assessments such as quizzes, tests, or presentations for their students.
Actor(s)	Lecturer
Precondition	Lecturer must be logged in and assigned to a subject.
Postcondition	Assessment schedule is saved and displayed to relevant students.
Main Flow	1. Lecturer navigates to "Schedule Assessment" page 2. Lecturer selects subject and assessment type 3. Lecturer sets date, time, and venue or online mode 4. System validates the input 5. System stores assessment and notifies students
Alternate Scenario	1. If time slot or venue is unavailable, system prompts to choose another 2. If submission fails due to system error, system shows retry prompt
Author	Yang Jia En
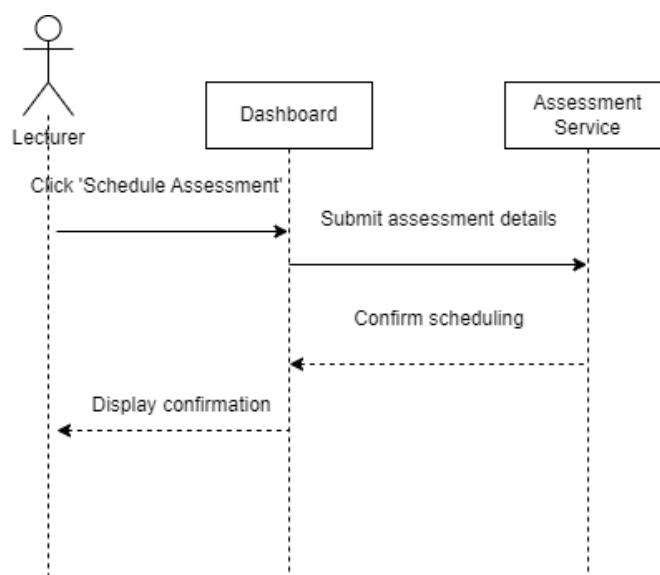
Figure 3.1.12.1: Lecturer schedule assessment sequence diagram
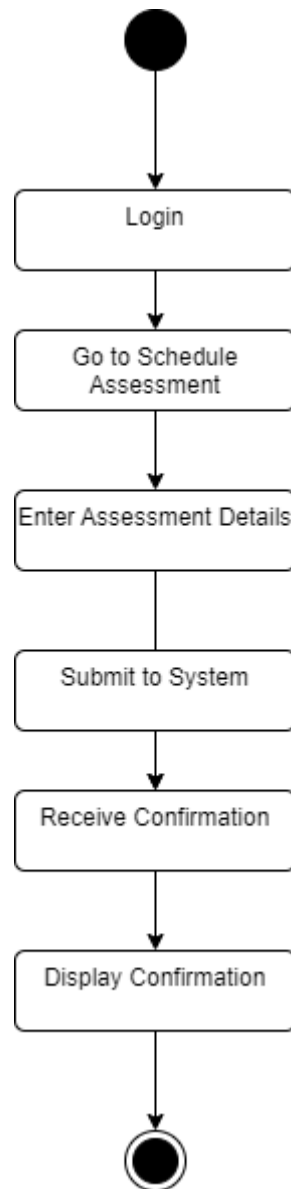
Figure 3.1.12.1: Lecturer schedule assessment activity diagram

3.1.13 Admin Approve Class Booking

Table 3.1.13: Admin approve class booking use case specifications table

ID	F-013
Feature	Approve Classroom Booking
Version	1.0
Purpose	To allow administrators to review and approve or reject classroom booking requests submitted by students.
Actor(s)	Admin
Precondition	Admin must be logged in and have access to booking requests.
Postcondition	Booking status is updated to "Approved" and student is notified.
Main Flow	1. Admin navigates to "Classroom Booking Requests" 2. System displays pending requests with booking details 3. Admin reviews details and approves booking 4. System updates booking status to "Approved" 5. System sends confirmation to student
Alternate Scenario	1. If room is no longer available, system prompts admin to reject or suggest alternate slot 2. If system fails to update status, admin is notified of the error
Author	Yang Jia En
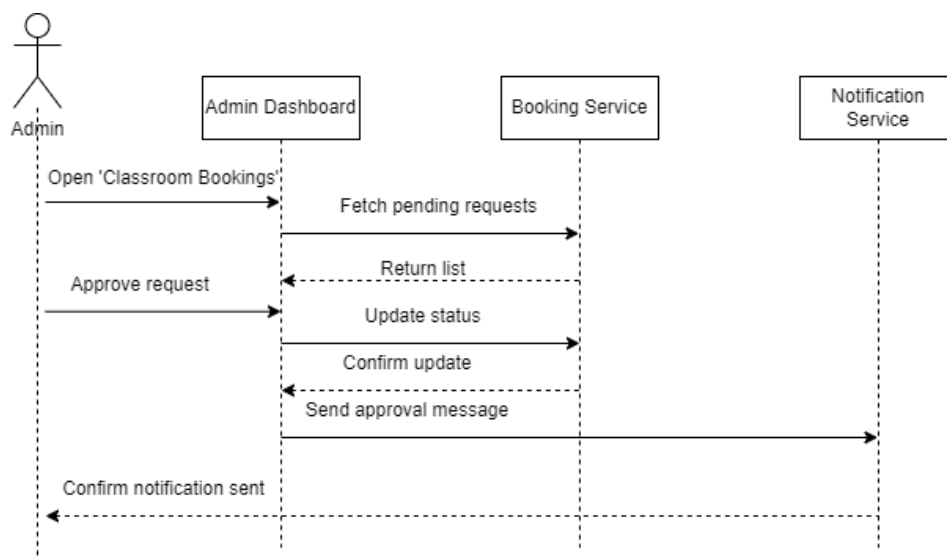
Figure 3.1.13.1: Admin approve class booking sequence diagram
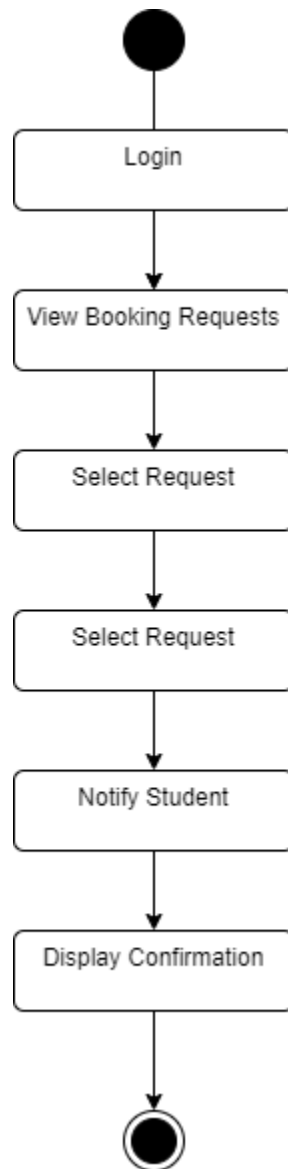
Figure 3.1.13.2: Admin approve class booking activity diagram

3.1.14 Admin Send Mass Announcements

Table 3.1.14: Admin send mass announcements use case specifications table

ID	F-014
Feature	Send Mass Announcements
Version	1.0
Purpose	To allow administrators to broadcast important announcements to all users or specific groups (students, parents, lecturers).
Actor(s)	Admin
Precondition	Admin must be logged in with appropriate permissions.
Postcondition	Announcement is sent to the selected user group(s) and stored in the system.
Main Flow	1. Admin navigates to "Send Mass Announcements" page 2. Admin selects target audience (e.g., All Students, All Users) 3. Admin writes the announcement content 4. System validates input 5. System stores the announcement and dispatches it to user dashboards or via SMS (if enabled)
Alternate Scenario	1. If no target group is selected or message is empty, system prompts for correction 2. If message dispatch fails, system shows error and logs the issue
Author	Yang Jia En
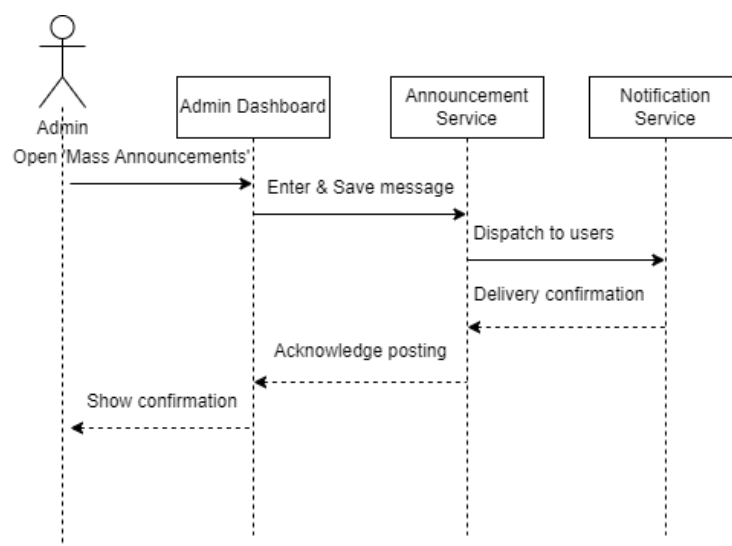
Figure 3.1.14.1: Admin send mass announcements sequence diagram
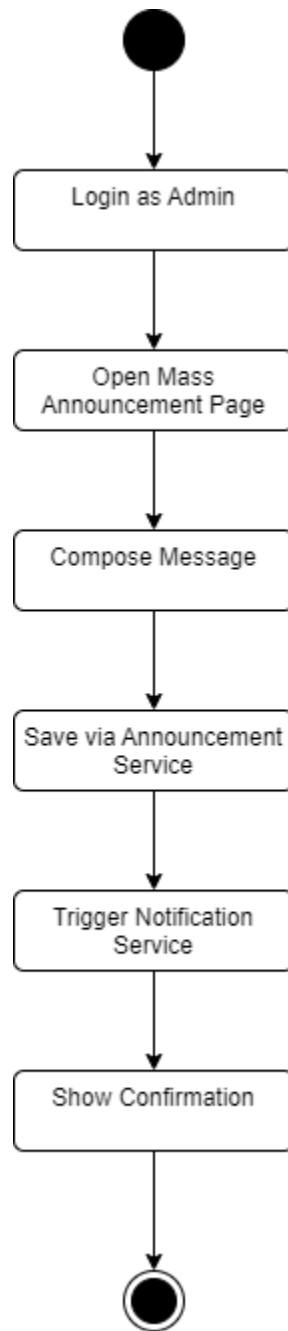
Figure 3.1.14.2: Admin send mass announcements activity diagram

3.2 Functional Requirements

This section outlines the system's required functionalities and behaviors to fulfill the needs of users and stakeholders. It specifies the essential operations, features, and interactions the system must support to achieve its goals. The table below presents a detailed list of all functional requirements, ensuring the system can operate efficiently and deliver its intended outcomes.

Table 3.2: Functional requirements table

Requirement ID	Description	Priority	Author
REQ_F001	The system shall allow students and parents to view academic performance, attendance, and billing information retrieved from the Campus Management System.	High	Teoh Xuan Xuan
REQ_F002	The system shall allow students to view timetables and exam schedules in a unified dashboard.	High	Teoh Xuan Xuan
REQ_F003	The system shall allow lecturers to upload materials and submit grades, and students to download materials.	High	Teoh Xuan Xuan
REQ_F004	The system shall allow students to book classrooms and allow admins to approve or reject bookings.	Medium	Teoh Xuan Xuan
REQ_F005	The system shall allow users to receive SMS notifications about academic performance, low attendance, and fee reminders.	High	Teoh Xuan Xuan

REQ_F006	The system shall allow parents to view their child's grades, attendance, and billing info.	High	Teoh Xuan Xuan
REQ_F007	The system shall allow the admin to send system-wide announcements to students, parents, and lecturers.	Medium	Teoh Xuan Xuan
REQ_F008	The system shall generate and send deadline reminders via email/SMS for assessments and fee payments.	Medium	Teoh Xuan Xuan
REQ_F009	The system shall support content approval workflow for admin-moderated announcements and booking requests.	Medium	Teoh Xuan Xuan

3.3 Performance Requirements

This section outlines the quality benchmarks the system must meet to ensure optimal performance. The platform is expected to deliver reliable, efficient, and responsive services to all users, including students, lecturers, administrators, and parents. It should support high availability, low latency, and consistent performance even during peak usage. The table below summarizes the specific performance requirements for the system.

Table 3.3: Performance requirements table

Requirement ID	Description	Priority	Author
REQ_P001	The system shall respond to user actions (login, view pages) within 1 to 2 seconds.	High	Teoh Xuan Xuan
REQ_P002	The system shall support up to 5,000 concurrent users without degradation in performance.	High	Teoh Xuan Xuan
REQ_P003	The system shall maintain at least 99.9% uptime, excluding scheduled maintenance periods.	High	Teoh Xuan Xuan
REQ_P004	The system shall retrieve and display student academic and billing data within 2 seconds.	Medium	Teoh Xuan Xuan
REQ_P005	The system shall process and send SMS notifications (e.g. fee alerts, attendance warnings) within 1 second of triggering.	High	Teoh Xuan Xuan
REQ_P006	The system shall allow parents to access child-related academic records within 3 seconds.	Medium	Teoh Xuan Xuan
REQ_P007	The system shall generate downloadable grade	Medium	Teoh Xuan Xuan

	reports within 5 seconds.		
REQ_P008	The system shall handle real-time classroom booking requests and return confirmation results within 2 seconds.	High	Teoh Xuan Xuan
REQ_P009	The system shall ensure minimal latency (<100ms) in communication between front-end and the Campus Management System APIs.	High	Teoh Xuan Xuan
REQ_P010	The system shall be accessible and stable across mobile and desktop platforms, with consistent performance.	Medium	Teoh Xuan Xuan

3.4 Usability Requirements

This section outlines the usability goals that the system aims to achieve to ensure a smooth and satisfying user experience. These requirements are designed to improve accessibility, reduce user effort, and enhance user engagement for students, lecturers, parents, and administrators. The table below lists all usability requirements with their descriptions and priorities.

Table 3.4: Usability requirements table

Requirement ID	Description	Priority	Author
REQ_U001	The platform shall provide a clean, consistent, and intuitive interface for all users to easily access academic and administrative services.	High	Teoh Xuan Xuan
REQ_U002	The system interface shall clearly label menu items such as Grades, Attendance, Timetable, and Billing for easy navigation.	Medium	Teoh Xuan Xuan
REQ_U003	The interface shall maintain a consistent color scheme and font usage to minimize distraction and support accessibility.	High	Teoh Xuan Xuan
REQ_U004	The platform shall be responsive and mobile-friendly, allowing smooth access on phones, tablets, and desktops.	High	Teoh Xuan Xuan
REQ_U005	The platform shall display real-time feedback for actions such as form submissions, file uploads, or failed actions.	High	Teoh Xuan Xuan
REQ_U006	The system shall support clear visual	High	Teoh Xuan Xuan

	cues (icons, colors) for system alerts like pending payments or low attendance warnings.		
REQ_U007	The platform shall allow students and parents to preview downloadable files (e.g., grade reports, fee statements) before downloading.	Low	Teoh Xuan Xuan
REQ_U008	The platform shall provide accessible features such as screen reader support and high-contrast mode for visually impaired users.	High	Teoh Xuan Xuan

3.5 Interface Requirements

3.5.1 IO01 Sign In Page

Table 3.5.1.1: Sign in button requirement

Requirement ID	REQ_IO0101
Version	1.0
Item	Sign In Button (Input)
Item Description	A button labelled "Sign In"
Item Purpose	To submit the login form for authentication
Input Format	Button
Valid Input	Not Applicable
Related I/O	REQ_IO0102, REQ_IO0103
Author	Yang Jia En

Table 3.5.1.2: User ID Field requirement

Requirement ID	REQ_IO0102
Version	1.0
Item	User ID Field (Input)
Item Description	A text field labelled "User ID"
Item Purpose	To capture the user's assigned login ID
Input Format	String
Valid Input	Alphanumeric string (6–20 chars)
Related I/O	REQ_IO0101
Author	Tey Jun Cheng

Table 3.5.1.3: Password Field requirement

Requirement ID	REQ_IO0103
Version	1.0
Item	Password Field (Input)
Item Description	A masked field for password input
Item Purpose	To receive the user's login password
Input Format	String
Valid Input	ASCII characters, 8–20 chars
Related I/O	REQ_IO0101
Author	Teoh Xuan Xuan

Table 3.5.1.4: Remember Me Checkbox requirement

Requirement ID	REQ_IO0104
Version	1.0
Item	Remember Me Checkbox (Input)
Item Description	A checkbox to optionally remember login session
Item Purpose	To keep users logged in between sessions
Input Format	Checkbox
Valid Input	Checked / Unchecked
Related I/O	REQ_IO0101
Author	Tey Jun Cheng

Table 3.5.1.5: Forgot Password requirement

Requirement ID	REQ_IO0105
Version	1.0
Item	Forgot Password Link
Item Description	A clickable link that redirects to the password recovery page
Item Purpose	To allow users to recover their account credentials
Input Format	Hyperlink
Valid Input	Click event
Related I/O	REQ_IO0102
Author	Teoh Xuan Xuan

Table 3.5.1.6: Error Message Display requirement

Requirement ID	REQ_IO0106
Version	1.0
Item	Error Message Display
Item Description	Displays "Email/Password does not match!" if login fails
Item Purpose	To inform user about incorrect login credentials
Input Format	Display Text
Valid Input	N/A (System generated)
Related I/O	REQ_IO0101
Author	Yang Jia En

3.5.2 IO02 Student Dashboard Page

Table 3.5.2.1: Enrolment Courses Display requirement

Requirement ID	REQ_IO0201
Version	1.0
Item	Enrolled Courses Display (Output)
Item Description	Displays cards showing course name, lecturer, class days, time, and location
Item Purpose	To inform students of their current enrolled subjects and timetable
Input Format	Display Panel
Valid Input	N/A
Related I/O	Academic Records API
Author	Yang Jia En

Table 3.5.2.2: Exam Board Table requirement

Requirement ID	REQ_IO0202
Version	1.0
Item	Exam Board Table (Output)
Item Description	Tabular display of exam name, course, date, time, location, and status
Item Purpose	To provide students with exam schedules and status updates
Input Format	Table
Valid Input	N/A
Related I/O	Exam Schedule Module
Author	Tey Jun Cheng

Table 3.5.2.3: Navigation Sidebar requirement

Requirement ID	REQ_IO0203
Version	1.0
Item	Navigation Sidebar (Input)
Item Description	List of clickable links: Main, Personal Information, University Subjects, Academic Records, Campus Finances, Campus Lifestyle, Announcements
Item Purpose	To allow students to navigate between core sections of the portal
Input Format	Clickable Link
Valid Input	Click events
Related I/O	All main page modules
Author	Teoh Xuan Xuan

Table 3.5.2.4: View All Button requirement

Requirement ID	REQ_IO0204
Version	1.0
Item	View All Button (Input)
Item Description	A small button/link labeled "View All" near Enrolled Courses and Exam Board
Item Purpose	To expand the section or redirect users to a full page view
Input Format	Button/Link
Valid Input	Click event
Related I/O	REQ_IO0201, REQ_IO0202
Author	Yang Jia En

Table 3.5.2.5: Log Out Link requirement

Requirement ID	REQ_IO0205
Version	1.0
Item	Log Out Link (Input)
Item Description	A text-based button allowing the user to log out of the session
Item Purpose	To end the user session and redirect to login page
Input Format	Link
Valid Input	Click event
Related I/O	Session Manager
Author	Tey Jun Cheng

3.5.3 IO03 View Billing Page

Table 3.5.3.1: Billing Summary Table requirement

Requirement ID	REQ_IO0301
Version	1.0
Item	Billing Summary Table (Output)
Item Description	A table displaying billing details by trimester including date, term, transaction term, due date, and total fee
Item Purpose	To give users a quick overview of outstanding or past billing by term
Input Format	Table
Valid Input	N/A
Related I/O	REQ_IO0302
Author	Teoh Xuan Xuan

Table 3.5.3.2: Search for Trimester requirement

Requirement ID	REQ_IO0302
Version	1.0
Item	Search for Trimester Field (Input)
Item Description	A text search box to filter billing summary by trimester
Item Purpose	To allow users to search for a specific term's billing
Input Format	Text field
Valid Input	Alphanumeric (e.g. "March/April 2025")
Related I/O	REQ_IO0301
Author	Yang Jia En

Table 3.5.3.3: Make Payment Button requirement

Requirement ID	REQ_IO0303
Version	1.0
Item	Make Payment Button (Input)
Item Description	A button that redirects to an external payment or billing system
Item Purpose	To initiate the fee payment process
Input Format	Button
Valid Input	Click event
Related I/O	External billing system
Author	Tey Jun Cheng

Table 3.5.3.4: Detailed Billing Table requirement

Requirement ID	REQ_IO0304
Version	1.0
Item	Detailed Billing Table (Output)
Item Description	A table showing all individual charges for a selected trimester: date, invoice number, item, subject, due date, charge, and status
Item Purpose	To allow users to understand specific charges and their status
Input Format	Table
Valid Input	N/A
Related I/O	REQ_IO0301
Author	Yang Jia En

Table 3.5.3.5: Print Bill Button requirement

Requirement ID	REQ_IO0305
Version	1.0
Item	Print Bill Button (Input)
Item Description	A button labeled "Print Bill" that generates a printable version of the detailed bill
Item Purpose	To allow students or parents to print the fee breakdown
Input Format	Button
Valid Input	Click event
Related I/O	REQ_IO0304
Author	Teoh Xuan Xuan

3.5.4 IO04 View Grades Page

Table 3.5.4.1: Grade Table requirement

Requirement ID	REQ_IO0401
Version	1.0
Item	Grade Table (Output)
Item Description	A table displaying each subject's code, name, trimester, and final grade
Item Purpose	To allow students and parents to view academic performance for each subject
Input Format	Table
Valid Input	N/A
Related I/O	Academic Record API
Author	Yang Jia En

Table 3.5.4.2: Trimester Filter Dropdown requirement

Requirement ID	REQ_IO0402
Version	1.0
Item	Trimester Filter Dropdown (Input)
Item Description	A dropdown menu listing trimesters (e.g., "March 2024", "Oct 2024")
Item Purpose	To allow users to filter grades by specific term
Input Format	Dropdown
Valid Input	Trimester ID
Related I/O	REQ_IO0401
Author	Tey Jun Cheng

Table 3.5.4.3: Download Grade Report Button requirement

Requirement ID	REQ_IO0403
Version	1.0
Item	Download Grade Report Button (Input)
Item Description	A button that generates and downloads a PDF grade report
Item Purpose	To allow students to save or print their results
Input Format	Button
Valid Input	Click event
Related I/O	Report Generator
Author	Teoh Xuan Xuan

3.5.5 IO05 View Announcements Page

Table 3.5.5.1: Announcement List requirement

Requirement ID	REQ_IO0501
Version	1.0
Item	Announcement List (Output)
Item Description	A vertical list showing announcement title, date, and a preview of content
Item Purpose	To inform users (students, parents, lecturers) of important university-wide updates
Input Format	Display list
Valid Input	N/A
Related I/O	Announcements API
Author	Yang Jia En

Table 3.5.5.2: View Full Announcement requirement

Requirement ID	REQ_IO0502
Version	1.0
Item	View Full Announcement Link (Input)
Item Description	A clickable link/button that expands or redirects to the full announcement details
Item Purpose	To allow users to view the complete content of an announcement
Input Format	Link or Button
Valid Input	Click event
Related I/O	REQ_IO0501
Author	Tey Jun Cheng

Table 3.5.5.3: Filter by Role/Category requirement

Requirement ID	REQ_IO0503
Version	1.0
Item	Filter by Role/Category (Input)
Item Description	Dropdown or toggle to filter announcements (e.g., for students, parents, lecturers)
Item Purpose	To display only relevant announcements based on user type
Input Format	Dropdown / Toggle
Valid Input	Role/category ID
Related I/O	REQ_IO0501
Author	Yang Jia En

3.5.6 IO06 View Attendance Page

Table 3.5.6.1: Announcement Record Table requirement

Requirement ID	REQ_IO0601
Version	1.0
Item	Attendance Record Table (Output)
Item Description	A table displaying subject code, subject name, percentage attended, total sessions, attended sessions
Item Purpose	To provide students and parents with a detailed view of attendance per subject
Input Format	Table
Valid Input	N/A
Related I/O	Attendance Module
Author	Tey Jun Cheng

Table 3.5.6.2: Filter by Trimester requirement

Requirement ID	REQ_IO0602
Version	1.0
Item	Filter by Trimester (Input)
Item Description	A dropdown to filter attendance records by trimester
Item Purpose	To allow users to view attendance data for a specific term
Input Format	Dropdown
Valid Input	Trimester value (e.g. March 2025)
Related I/O	REQ_IO0601
Author	Yang Jia En

Table 3.5.6.3: Status Indicator requirement

Requirement ID	REQ_IO0603
Version	1.0
Item	Status Indicator (Output)
Item Description	Colored labels or icons indicating status (e.g., Good, Warning, Low) based on attendance percentage
Item Purpose	To give visual cues to users about attendance risk levels
Input Format	Display icon/text
Valid Input	N/A (System-calculated)
Related I/O	REQ_IO0601
Author	Teoh Xuan Xuan

3.5.7 IO07 View Timetable Page

Table 3.5.7.1: Weekly Timetable Grid requirement

Requirement ID	REQ_IO0701
Version	1.0
Item	Weekly Timetable Grid (Output)
Item Description	A visual calendar-style layout displaying subjects by day and time slots
Item Purpose	To help students view their weekly schedule and class locations
Input Format	Grid display
Valid Input	N/A
Related I/O	Timetable API
Author	Teoh Xuan Xuan

Table 3.5.7.2: Day/Week View Toggle requirement

Requirement ID	REQ_IO0702
Version	1.0
Item	Day/Week View Toggle (Input)
Item Description	Toggle option to switch between daily view and full-week view
Item Purpose	To allow users to adjust how much schedule info is shown at once
Input Format	Toggle
Valid Input	Day / Week
Related I/O	REQ_IO0701
Author	Yang Jia En

Table 3.5.7.3: Trimester Filter requirement

Requirement ID	REQ_IO0703
Version	1.0
Item	Trimester Filter (Input)
Item Description	Dropdown to select which trimester's timetable to view
Item Purpose	To display class schedules based on selected academic term
Input Format	Dropdown
Valid Input	Trimester ID
Related I/O	REQ_IO0701
Author	Tey Jun Cheng

3.5.8 IO08 Book Classroom Page

Table 3.5.8.1: Classroom Booking Form requirement

Requirement ID	REQ_IO0801
Version	1.0
Item	Classroom Booking Form (Input)
Item Description	A form containing fields for date, time, classroom, purpose, and submit button
Item Purpose	To allow students to request classroom use for study or group work
Input Format	Form
Valid Input	Date (YYYY-MM-DD), Time (HH:MM), Room Code, Text (max 200 chars)
Related I/O	REQ_IO0802
Author	Yang Jia En

Table 3.5.8.2: Submit Booking Button requirement

Requirement ID	REQ_IO0802
Version	1.0
Item	Submit Booking Button (Input)
Item Description	A button labeled "Submit" to send booking request for approval
Item Purpose	To initiate booking validation and approval workflow
Input Format	Button
Valid Input	Click event
Related I/O	REQ_IO0801, Admin Approval Module
Author	Teoh Xuan Xuan

Table 3.5.8.3: Booking Status Feedback requirement

Requirement ID	REQ_IO0803
Version	1.0
Item	Booking Status Feedback (Output)
Item Description	A message confirming submission or indicating booking status (e.g. pending, approved, rejected)
Item Purpose	To inform users of booking result or current status
Input Format	Text/Alert
Valid Input	N/A (System-generated)
Related I/O	REQ_IO0801
Author	Tey Jun Cheng

3.5.9 IO09 Upload Materials Page (Lecturer)

Table 3.5.9.1: File Upload Field requirement

Requirement ID	REQ_IO0901
Version	1.0
Item	File Upload Field (Input)
Item Description	A field that allows lecturers to browse and select a file from their device
Item Purpose	To upload lecture materials such as PDFs, slides, or documents
Input Format	File input
Valid Input	.pdf, .pptx, .docx, .zip (max 50MB)
Related I/O	REQ_IO0902
Author	Teoh Xuan Xuan

Table 3.5.9.2: Description Field requirement

Requirement ID	REQ_IO0902
Version	1.0
Item	Description Field (Input)
Item Description	A text input for the material's title or description
Item Purpose	To label uploaded materials for student reference
Input Format	Text
Valid Input	Alphanumeric (max 100 characters)
Related I/O	REQ_IO0901
Author	Yang Jia En

Table 3.5.9.3: Subject Selector requirement

Requirement ID	REQ_IO0903
Version	1.0
Item	Subject Selector (Input)
Item Description	A dropdown list of subjects assigned to the lecturer
Item Purpose	To associate uploaded material with the correct course
Input Format	Dropdown
Valid Input	Subject code or name
Related I/O	REQ_IO0901
Author	Tey Jun Cheng

Table 3.5.9.4: Upload Button requirement

Requirement ID	REQ_IO0904
Version	1.0
Item	Upload Button (Input)
Item Description	A button labeled "Upload" that sends the material to the system
Item Purpose	To finalize and submit the upload action
Input Format	Button
Valid Input	Click event
Related I/O	REQ_IO0901, REQ_IO0902, REQ_IO0903
Author	Yang Jia En

Table 3.5.9.5: Upload Confirmation Message requirement

Requirement ID	REQ_IO0905
Version	1.0
Item	Upload Confirmation Message (Output)
Item Description	A system-generated success/failure message after upload attempt
Item Purpose	To inform the lecturer if the upload was successful or not
Input Format	Message
Valid Input	N/A (System-generated)
Related I/O	REQ_IO0904
Author	Teoh Xuan Xuan

3.5.10 IO10 Submit Grades Page (Lecturer)

Table 3.5.10.1: Subject Selector Dropdown requirement

Requirement ID	REQ_IO1001
Version	1.0
Item	Subject Selector Dropdown (Input)
Item Description	A dropdown list of subjects assigned to the lecturer
Item Purpose	To choose the course for which grades will be entered
Input Format	Dropdown
Valid Input	Subject Code (e.g., CSE1234)
Related I/O	REQ_IO1002
Author	Tey Jun Cheng

Table 3.5.10.2: Grade Entry Table requirement

Requirement ID	REQ_IO1002
Version	1.0
Item	Grade Entry Table (Input)
Item Description	A table listing enrolled students with fields to enter grades per student
Item Purpose	To input and review each student's final grade
Input Format	Table with editable fields
Valid Input	Grade values (e.g., A, B+, C, F)
Related I/O	REQ_IO1001, REQ_IO1003
Author	Yang Jia En

Table 3.5.10.3: Submit Grades Button requirement

Requirement ID	REQ_IO1003
Version	1.0
Item	Submit Grades Button (Input)
Item Description	A button to confirm and submit the entered grades to the system
Item Purpose	To finalize and send grades for storage and student access
Input Format	Button
Valid Input	Click event
Related I/O	REQ_IO1002
Author	Teoh Xuan Xuan

Table 3.5.10.4: Submission Confirmation Message requirement

Requirement ID	REQ_IO1004
Version	1.0
Item	Submission Confirmation Message (Output)
Item Description	A message confirming successful or failed grade submission
Item Purpose	To provide feedback to the lecturer after clicking "Submit"
Input Format	System Message
Valid Input	N/A (System-generated)
Related I/O	REQ_IO1003
Author	Teoh Xuan Xuan

3.5.11 IO11 Send Announcement Page (Lecturer)

Table 3.5.11.1: Announcement Text Field requirement

Requirement ID	REQ_IO1101
Version	1.0
Item	Announcement Text Field (Input)
Item Description	A large text box where the lecturer types the message content
Item Purpose	To compose the announcement to be sent to students
Input Format	Text Area
Valid Input	Up to 500 characters
Related I/O	REQ_IO1103
Author	Yang Jia En

Table 3.5.11.2: Target Group Selector requirement

Requirement ID	REQ_IO1102
Version	1.0
Item	Target Group Selector (Input)
Item Description	A dropdown to select which class/subject group to send the announcement to
Item Purpose	To define the recipients of the announcement
Input Format	Dropdown
Valid Input	Subject code / class group ID
Related I/O	REQ_IO1101
Author	Tey Jun Cheng

Table 3.5.11.3: Send Button requirement

Requirement ID	REQ_IO1103
Version	1.0
Item	Send Button (Input)
Item Description	A button that submits the message to the selected recipients
Item Purpose	To deliver the announcement via the system to the selected users
Input Format	Button
Valid Input	Click event
Related I/O	REQ_IO1101, REQ_IO1102
Author	Tey Jun Cheng

Table 3.5.11.4: Confirmation/Error Message requirement

Requirement ID	REQ_IO1104
Version	1.0
Item	Confirmation/Error Message (Output)
Item Description	System feedback showing whether the announcement was sent successfully or if an error occurred
Item Purpose	To provide feedback to the lecturer after submission
Input Format	Message
Valid Input	N/A (System-generated)
Related I/O	REQ_IO1103
Author	Yang Jia En

3.5.12 IO12 Approve Classroom Booking Page (Admin)

Table 3.5.12.1: Booking Requests Table requirement

Requirement ID	REQ_IO1201
Version	1.0
Item	Booking Requests Table (Output)
Item Description	A table showing pending requests with fields like student name, date, time, room, and purpose
Item Purpose	To allow admins to review all pending classroom booking requests
Input Format	Table
Valid Input	N/A
Related I/O	REQ_IO1202, REQ_IO1203
Author	Yang Jia En

Table 3.5.12.2: Approve Button requirement

Requirement ID	REQ_IO1202
Version	1.0
Item	Approve Button (Input)
Item Description	A button next to each booking entry to approve the request
Item Purpose	To confirm and allow the requested classroom use
Input Format	Button
Valid Input	Click event
Related I/O	REQ_IO1201
Author	Teoh Xuan Xuan

Table 3.5.12.3: Reject Button requirement

Requirement ID	REQ_IO1203
Version	1.0
Item	Reject Button (Input)
Item Description	A button to reject the booking request
Item Purpose	To deny room usage if unavailable or inappropriate
Input Format	Button
Valid Input	Click event
Related I/O	REQ_IO1201
Author	Teoh Xuan Xuan

Table 3.5.12.4: Decision Status Message requirement

Requirement ID	REQ_IO1204
Version	1.0
Item	Decision Status Message (Output)
Item Description	A success/failure message that confirms the decision was processed
Item Purpose	To inform the admin of successful approval or rejection
Input Format	Message
Valid Input	N/A (System-generated)
Related I/O	REQ_IO1202, REQ_IO1203
Author	Tey Jun Cheng

3.5.13 IO13 Send Mass Announcements Page (Admin)

Table 3.5.13.1: Announcement Text Field requirement

Requirement ID	REQ_IO1301
Version	1.0
Item	Announcement Text Field (Input)
Item Description	A text area where the admin composes the announcement message
Item Purpose	To allow admins to draft announcements to be sent to all system users or specific groups
Input Format	Text Area
Valid Input	Up to 1000 characters
Related I/O	REQ_IO1303
Author	Tey Jun Cheng

Table 3.5.13.2: Target Audience Selector requirement

Requirement ID	REQ_IO1302
Version	1.0
Item	Target Audience Selector (Input)
Item Description	Dropdowns or checkboxes to select recipients (e.g., all students, lecturers, parents)
Item Purpose	To define who will receive the announcement
Input Format	Multi-select dropdown / checkbox group
Valid Input	User roles (Student, Parent, Lecturer)
Related I/O	REQ_IO1301
Author	Tey Jun Cheng

Table 3.5.13.3: Send Button requirement

Requirement ID	REQ_IO1303
Version	1.0
Item	Send Button (Input)
Item Description	A button that triggers the broadcast of the announcement
Item Purpose	To send the announcement to all selected recipients
Input Format	Button
Valid Input	Click event
Related I/O	REQ_IO1301, REQ_IO1302
Author	Yang Jia En

Table 3.5.13.4: System Feedback Message requirement

Requirement ID	REQ_IO1304
Version	1.0
Item	System Feedback Message (Output)
Item Description	A confirmation or error message after clicking the "Send" button
Item Purpose	To notify the admin if the announcement was successfully sent or not
Input Format	Message
Valid Input	N/A (System-generated)
Related I/O	REQ_IO1303
Author	Teoh Xuan Xuan

3.6 Logical Database Requirements
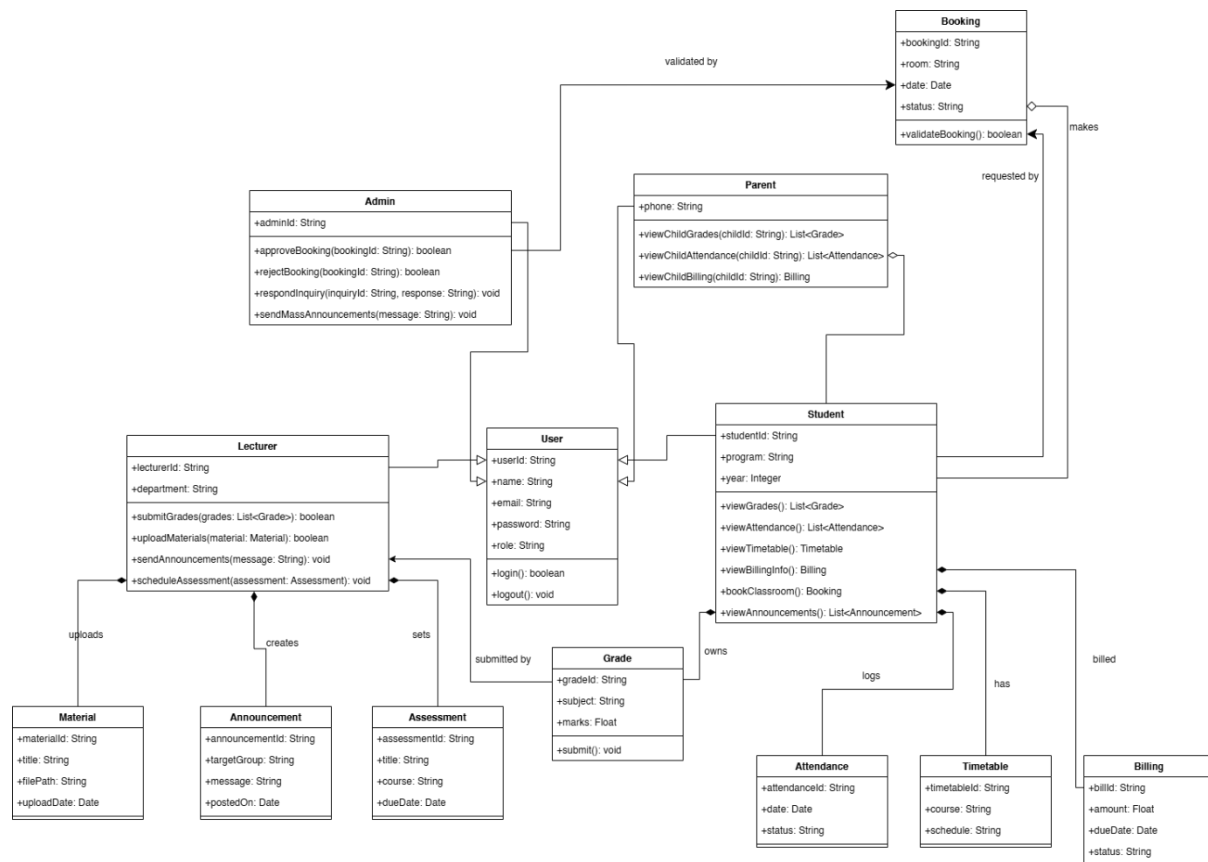
Figure 3.6: Class Diagram

The Class Diagram in Figure 3.6 illustrates the static structure of the University Communication and Services Portal (myMMU), showing the system's classes, their attributes, operations (methods), and the relationships among objects. This model reflects how different users such as Students, Parents, Lecturers, and Admins interact with various components within the platform.

The central class is User, which serves as a generalization for specific roles like Student, Parent, Lecturer, and Admin. Each user type has distinct functionalities defined in their respective classes. The Student class, for example, provides methods to view grades, attendance, timetables, billing info, book classrooms, and view announcements. The Parent class allows access to a child's academic and billing information, while Lecturers can upload materials, submit grades, send announcements, and schedule assessments. Admins are responsible for approving bookings, managing inquiries, and sending mass announcements.

Supporting classes include Booking, Grade, Attendance, Timetable, Billing, Material, Announcement, and Assessment. These classes represent the core data entities manipulated by user roles. Relationships between these classes are modeled using associations such as "owns," "uploads," "raises," and "monitors," indicating how information flows and how entities interact within the system. The subsections below will describe each model and their data attributes. It will detail how the data will be stored inside the database as well as the description of each data attribute.

3.6.1 User Class

Table 3.6.1: User Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
userID	Unique identifier of a user	UUID	Primary Key Not Null Unique	
username	Username picked by user	String	Not Null Unique	Login Credentials
password	User account password	String	Not Null	Login Credentials
name	Full name of the user	String	Not Null	
email	Email address	String	Not Null	
blockedUsers	List of blocked users	Array<User>		
followedUsers	List of followed users	Array<User>		
linkedSocMed	Linked social media accounts	Array<SocialMedia>		
privateChat	Conversation history	Hashmap<User, Array<String>>		

3.6.2 Student Class

Table 3.6.2: Student Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
studentId	Student unique ID	String	Primary Key Not Null	
program	Program enrolled	String	Not Null	
year	Year of study	Integer	Not Null	

3.6.3 Lecturer Class

Table 3.6.3: Lecturer Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
lecturerId	Lecturer ID	String	Primary Key Not Null	
department	Department name	String	Not Null	

3.6.4 Parent Class

Table 3.6.4: Parent Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
phone	Parent's contact number	String	Not Null	

3.6.5 Admin Class

Table 3.6.5: Admin Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
adminId	Admin ID	String	Primary Key Not Null	
office	Office location	String		

3.6.6 Booking Class

Table 3.6.6: Booking Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
bookingId	Booking ID	String	Primary Key	
room	Room number/name	String	Not Null	
date	Booking date	Date	Not Null	
status	Booking status	String	Pending/Approved/Rejected	

3.6.7 Grade Class

Table 3.6.7: Grade Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
gradeId	Grade record ID	String	Primary Key	
studentId	Student who received grade	String	Foreign Key	
subject	Subject name	String		
marks	Score received	Float		

3.6.8 Billing Class

Table 3.6.8: Billing Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
billId	Billing ID	String	Primary Key	
studentId	Student responsible	String	Foreign Key	
amount	Bill amount	Float		
dueDate	Due date	Date		
status	Paid or Unpaid	String		

3.6.9 Attendance Class

Table 3.6.9: Attendance Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
attendanceId	Attendance record ID	String	Primary Key	
studentId	Student who attended	String	Foreign Key	
date	Attendance date	Date		
status	Present/Absent	String		

3.6.10 Material Class

Table 3.6.10: Material Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
materialId	Material ID	String	Primary Key	
lecturerId	Uploader's ID	String	Foreign Key	
title	Material title	String	Not Null	
filePath	Storage path or URL	String		
uploadDate	Date uploaded	Date		

3.6.11 Announcement Class

Table 3.6.11: Announcement Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
announcementId	Announcement ID	String	Primary Key	
senderId	Sender user ID	String	Foreign Key	
targetGroup	Target audience	String		e.g., student, parent, lecturer
message	Message content	String	Not Null	
postedOn	Post date	Date		

3.6.12 Timetable Class

Table 3.6.12: Timetable Data Dictionary

Field Name	Description	Data Type	Constraints	Extra Notes
timetableId	Timetable ID	String	Primary Key	
studentId	Linked student	String	Foreign Key	
course	Course name	String		
schedule	Class time info	String		

3.6.13 Assessment Class

Table 3.6.13: Assessment Class

Field Name	Description	Data Type	Constraints	Extra Notes
assessmentId	Assessment ID	String	Primary Key	
lecturerId	Lecturer responsible	String	Foreign Key	
title	Assessment title	String	Not Null	
course	Associated course	String		
dueDate	Submission deadline	Date		

3.7 Design Constraints

This section outlines the design constraints and limitations that must be taken into account throughout the development of the system. These constraints may stem from legal, technical, organizational, and usability factors. They help ensure that the system aligns with regulatory compliance, organizational policies, and platform compatibility standards. The table below presents the key design constraints applicable to the system.

Table 3.7: Design constraints table

Requirement ID	Description	Priority	Author
REQ_DC001	The system shall comply with the Web Content Accessibility Guidelines (WCAG) to ensure usability for users with disabilities.	Medium	Tey Jun Cheng
REQ_DC002	The system shall process personal data in compliance with the Personal Data Protection Act (PDPA) and applicable regulations.	High	Tey Jun Cheng
REQ_DC003	The system shall be developed and deployed within a 2-year timeframe to meet academic cycle planning.	High	Tey Jun Cheng
REQ_DC004	The system shall not contain any advertisements or third-party marketing content.	High	Tey Jun Cheng
REQ_DC005	The platform shall use secure and approved libraries and frameworks to reduce security risks.	Medium	Tey Jun Cheng
REQ_DC006	The system shall be compatible with commonly used web browsers (e.g., Chrome, Firefox,	High	Tey Jun Cheng

	Edge, Safari) and mobile platforms.		
REQ_DC007	The system shall be optimized for both desktop and mobile use, ensuring consistent user experience.	High	Tey Jun Cheng
REQ_DC008	The platform shall integrate with the existing university Campus Management System and SMS Gateway without major infrastructure changes.	High	Tey Jun Cheng
REQ_DC009	The platform shall align with the university's branding, including logo usage, color schemes, and tone of communication.	Medium	Tey Jun Cheng
REQ_DC010	The system shall be designed with modularity to support future scalability, feature expansion, and integration.	High	Tey Jun Cheng
REQ_DC011	The system shall implement encryption techniques compliant with university IT security standards to protect sensitive data.	High	Tey Jun Cheng
REQ_DC012	The system shall follow low energy consumption standards to minimize environmental impact of 24/7 hosting.	Low	Tey Jun Cheng

3.8 Standard Compliance

This section outlines the standard compliance requirements considered during the development of the myMMU University Communication and Services Portal. These requirements ensure that the system aligns with relevant regulations, promotes secure data handling, enhances accessibility for all users, and ensures system interoperability and quality.

Table 3.8: Standard Compliance Table

Requirement ID	Description	Priority	Author
REQ_SC001	The system shall comply with the Personal Data Protection Act (PDPA) to ensure secure handling of students', parents', and staff's personal and academic data.	High	Yang Jia En
REQ_SC002	The platform shall adhere to the Web Content Accessibility Guidelines (WCAG) 2.1, ensuring the system is accessible to users with disabilities, including support for screen readers and high-contrast modes.	High	Yang Jia En
REQ_SC003	The platform shall follow the ISO/IEC 27001 standard to implement and maintain effective information security controls.	High	Yang Jia En
REQ_SC004	The system shall align with the ISO/IEC 25010 quality model to ensure proper focus on functionality, reliability, usability, and maintainability.	Medium	Yang Jia En
REQ_SC005	The system shall comply with the Digital Millennium Copyright Act (DMCA) or equivalent institutional copyright policies to avoid infringement of uploaded educational content.	Medium	Yang Jia En

3.9 Software System Attributes

This section describes the essential qualities and characteristics the University Communication and Services Portal must fulfill. These software attributes define how the system should behave in terms of performance, reliability, maintainability, and user interaction, ensuring the system functions smoothly and supports its users effectively.

3.9.1 Accuracy

Table 3.9.1: Accuracy Table

Requirement ID	Description	Priority	Author
REQ_SRA001	The system shall maintain an error rate below 0.001% in all academic calculations and data displays (e.g., grade averages, billing summaries).	High	Yang Jia En

3.9.2 Availability

Table 3.9.2: Availability Table

Requirement ID	Description	Priority	Author
REQ_SRA002	The system shall ensure at least 99.9% uptime with a maximum downtime of 8 hours annually, excluding scheduled maintenance.	High	Tey Jun Cheng

3.9.3 Reliability

Table 3.9.3: Reliability Table

Requirement ID	Description	Priority	Author
REQ_SRA003	The system shall handle large volumes of student logins and data access requests without crashing.	High	Teoh Xuan Xuan

3.9.4 Security

Table 3.9.4: Security Table

Requirement ID	Description	Priority	Author
REQ_SRA006	All user data shall be protected from unauthorized access through secure storage and retrieval mechanisms.	High	Yang Jia En
REQ_SRA007	The system shall implement secure login, role-based access control, and encrypted data transmission.	High	Yang Jia En
REQ_SRA008	The server APIs shall authenticate requests and verify session integrity.	High	Yang Jia En
REQ_SRA009	The system shall enforce strong password policies including complexity and expiration.	High	Yang Jia En
REQ_SRA010	The system shall undergo regular penetration testing and vulnerability assessments.	Medium	Yang Jia En
REQ_SRA011	The system shall include a firewall and monitoring system to protect against external threats.	High	Yang Jia En
REQ_SRA012	The system shall support multi-factor authentication for enhanced security.	High	Yang Jia En
REQ_SRA013	The system shall apply data masking in staging environments to protect sensitive records.	Medium	Yang Jia En

3.9.5 Maintainability

Table 3.9.5: Maintainability Table

Requirement ID	Description	Priority	Author
REQ_SRA014	The system's codebase shall be well-documented to support efficient updates and troubleshooting.	High	Tey Jun Cheng
REQ_SRA015	The system shall use version control to track changes and ensure collaborative updates.	High	Tey Jun Cheng
REQ_SRA016	The system shall be developed using modular and agile principles.	High	Tey Jun Cheng
REQ_SRA017	The code shall maintain low coupling and high cohesion to simplify testing and maintenance.	High	Tey Jun Cheng
REQ_SRA018	The system shall provide logs for user activity and errors to assist with diagnostics.	High	Tey Jun Cheng
REQ_SRA019	The platform shall offer manuals and help documents for staff and IT administrators.	Medium	Tey Jun Cheng
REQ_SRA020	The system shall have a backup and disaster recovery mechanism with quarterly drills.	High	Tey Jun Cheng
REQ_SRA021	The system shall support future upgrades without affecting existing services.	High	Tey Jun Cheng
REQ_SRA022	The system shall be backward compatible with previous releases for	Medium	Tey Jun Cheng

Requirement ID	Description	Priority	Author
	a minimum of one academic year.		
REQ_SRA023	A support channel shall be available for users to report technical issues and receive help.	High	Tey Jun Cheng

3.9.6 Portability

Table 3.9.6: Portability Table

Requirement ID	Description	Priority	Author
REQ_SRA024	The system shall support access on major operating systems (Windows, macOS, Linux, Android, iOS).	High	Teoh Xuan Xuan
REQ_SRA025	The system shall function correctly on standard web browsers including Chrome, Firefox, Safari, and Edge.	High	Teoh Xuan Xuan

3.9.7 Usability

Table 3.9.7: Usability Table

Requirement ID	Description	Priority	Author
REQ_SRA026	The system shall maintain a consistent UI layout, theme, and interaction style.	High	Yang Jia En
REQ_SRA027	The system interface shall be intuitive, easy to navigate, and understandable for all user groups.	High	Yang Jia En

3.10 Supporting Information

Throughout the elicitation phase, five elicitation methods were used to understand the users' needs and requirements towards the development of myMMU.

3.10.1 Brainstorming

An initial brainstorming session involving all team members was conducted to hypothesize user needs and pain points with the current system. The session identified core stakeholder groups and proposed feature ideas including:

- Role-based portal views (student, lecturer, parent, admin)
- SMS notifications for billing and attendance alerts
- A classroom booking module with admin approval
- A user-friendly dashboard and accessibility enhancements

The ideas generated during this phase informed the direction of subsequent elicitation techniques and prototype designs.

3.10.2 Questionnaire

A structured questionnaire comprising over 30 questions was disseminated to stakeholders through Google Forms over a span of five days. More than 25 responses were collected from diverse user roles, including students, lecturers, parents, and admins. The questionnaire incorporated Likert-scale, multiple-choice, and open-ended questions, and utilized Kano-style paired questions to help classify features as dissatisfiers, satisfiers, or delighters.

Key Findings:

- Students expressed strong interest in real-time access to academic records, attendance, and billing information.
- Parents emphasized the value of SMS notifications for academic alerts and fee reminders.
- Lecturers prioritized ease in uploading materials and scheduling assessments.
- Users across all roles suggested improvements in login experience, such as a "Remember Me" option.

Below are the results and demographic for the questionnaire.

How often do you access the university portal?

25 responses
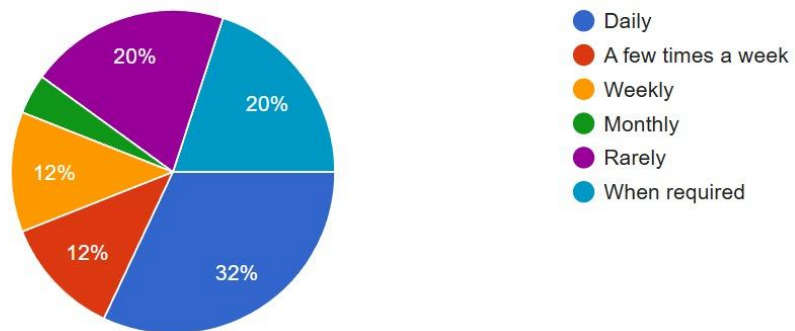
Figure 3.10.2.1: Questionnaire Response 1

Which of these features do you currently use?

Copy chart

9 responses
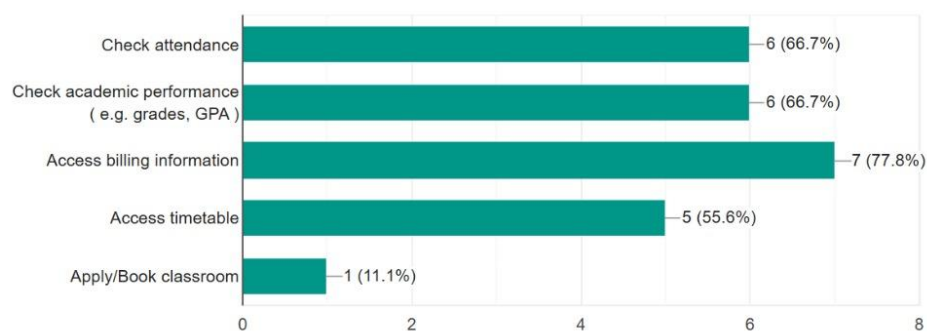
Figure 3.10.2.2: Questionnaire Response 2

How would you feel if your attendance records were automatically updated and visible?

Copy chart

9 responses

Figure 3.10.2.3: Questionnaire Response 3

How would you feel if you could check your academic performance (e.g., grades, GPA) anytime through the portal?

Copy chart

9 responses

Figure 3.10.2.4: Questionnaire Response 4

How would you feel if you could view your billing and payment history in details directly through the portal?

Copy chart
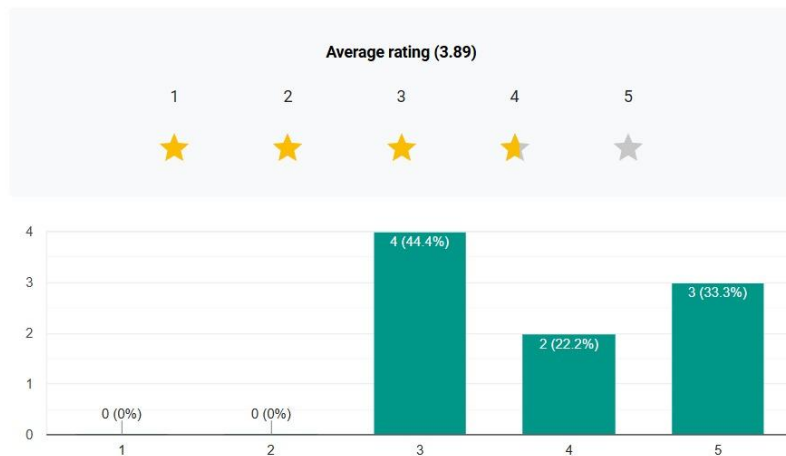
9 responses

Figure 3.10.2.5: Questionnaire Response 5

How would you feel if you received tuition fee reminders before the due date?
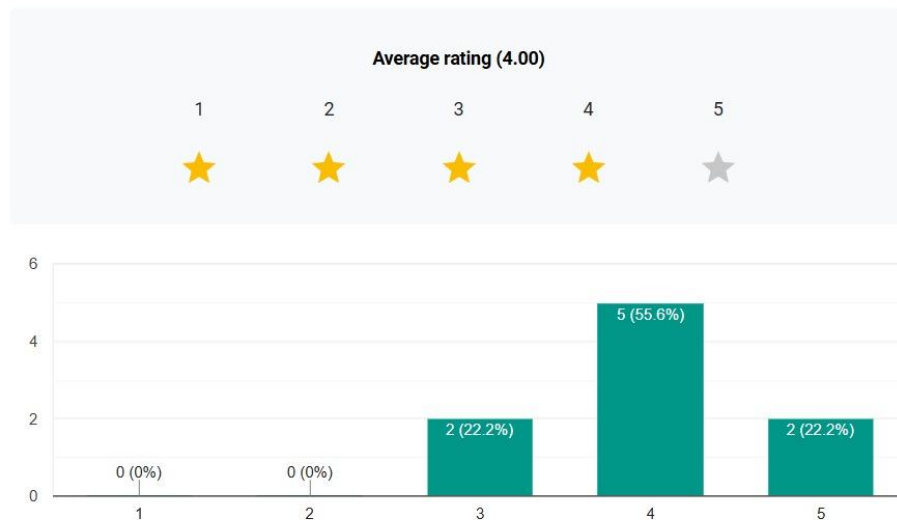
9 responses

Figure 3.10.2.6: Questionnaire Response 6

How would you feel if your full class schedule and exam timetable are display easily viewing?
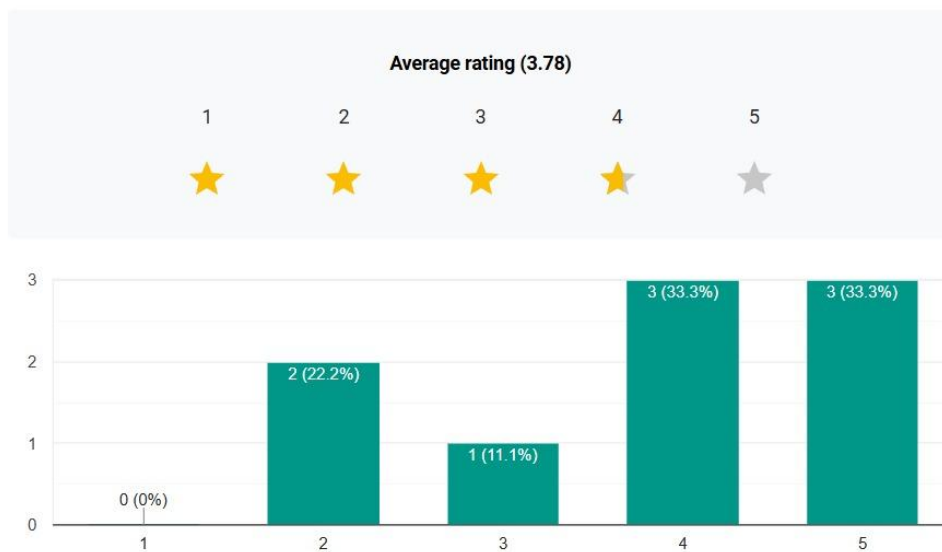
9 responses

Figure 3.10.2.7: Questionnaire Response 7

How important is it to you to have an easier way to book classrooms for assignments or project work?

9 responses

Figure 3.10.2.8: Questionnaire Response 8

How would you feel if you always saw the latest announcements about timetable changes, fee alerts, or campus news?

9 responses

Figure 3.10.2.9: Questionnaire Response 9

How would you feel if you received SMS alerts for things like low attendance or released grades?

Copy chart

9 responses

Figure 3.10.2.10: Questionnaire Response 10

Which method(s) would you prefer for receiving such notifications?

9 responses
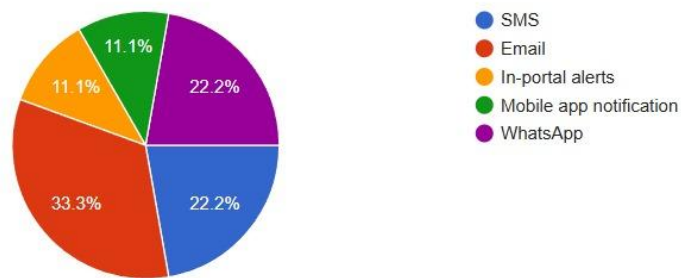
Figure 3.10.2.11: Questionnaire Response 11

How would you feel if you were required to sign in every time to access university services?

Copy chart

9 responses

Figure 3.10.2.12: Questionnaire Response 12

How would you feel if your sign-in session lasted longer before needing to log in again?

9 responses

Figure 3.10.2.13: Questionnaire Response 13

Preferred duration for a longer sign-in session

9 responses
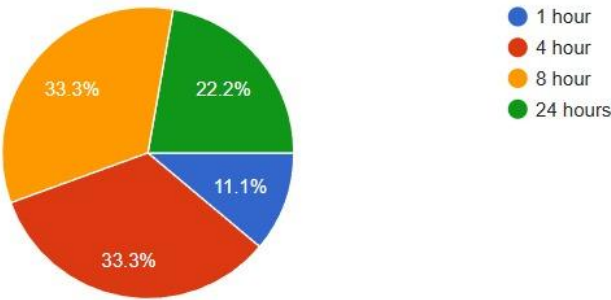
Figure 3.10.2.14: Questionnaire Response 14

What features would you like to improve or add?

9 responses

One-click access to timetable and attendance

need accurate output

Fee breakdown with payment tracking

Less frequent login verification

send email for payment receipt and summary details for course fee

no

Direct communication with lecturers

Access to academic calendar and events

Figure 3.10.2.15: Questionnaire Response 15

Would you like to receive important notifications from the university (e.g., your child's low attendance, fee reminders, academic performance updates) via SMS?

5 responses
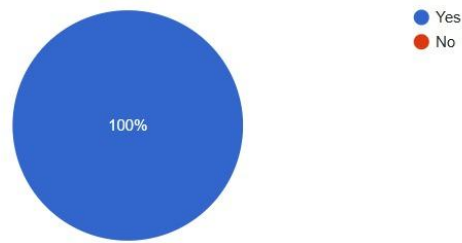
Figure 3.10.2.16: Questionnaire Response 16

If yes, which of the following methods would you prefer for receiving these updates?

Copy chart

5 responses
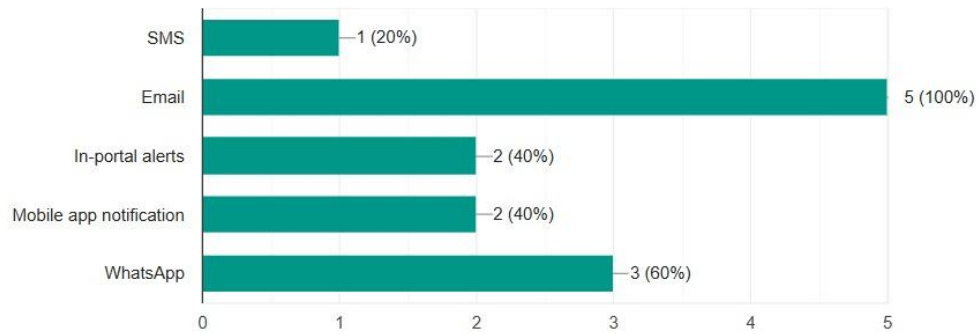
Figure 3.10.2.17: Questionnaire Response 17

As a parent, which of the following portal features do you find most useful or important?

Copy chart

5 responses
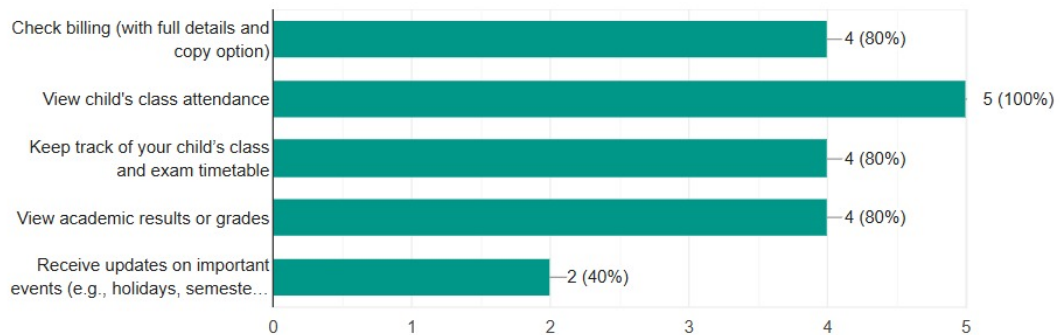
Figure 3.10.2.18: Questionnaire Response 18

Would you like the portal to include a help or support section for questions and problems?

5 responses
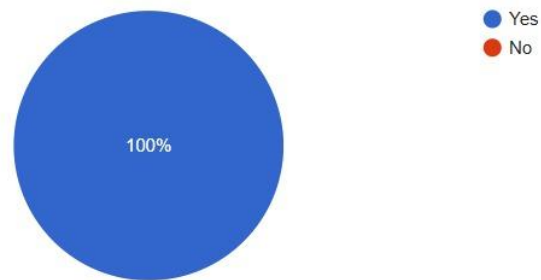
Figure 3.10.2.19: Questionnaire Response 19

Would you find it helpful to receive automated notifications for:
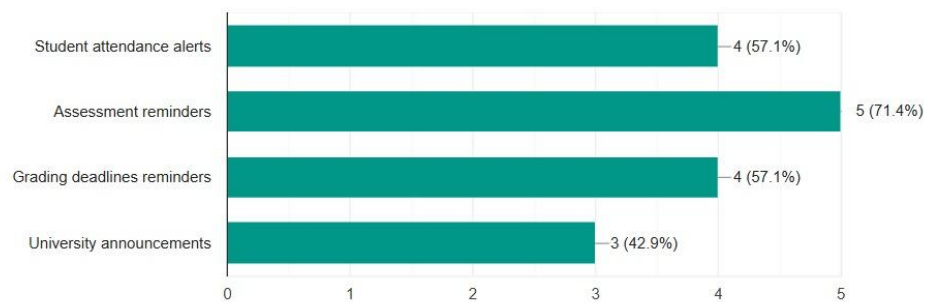
7 responses

Figure 3.10.2.20: Questionnaire Response 20

How effective is the attendance monitoring feature for your needs?
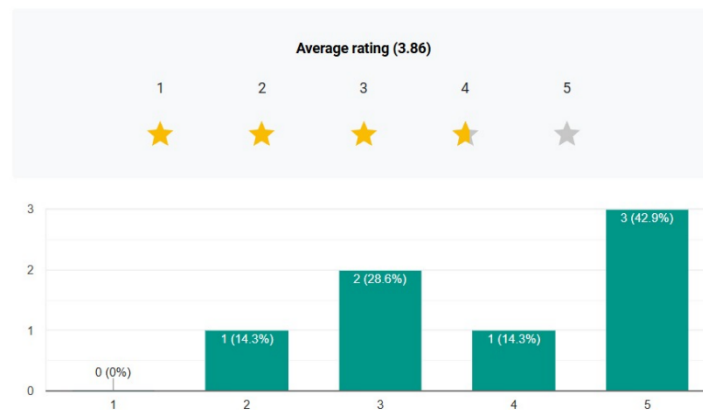
7 responses

Figure 3.10.2.21: Questionnaire Response 21

How would you feel if you could upload lecture notes, assignments, and materials for students via the portal?
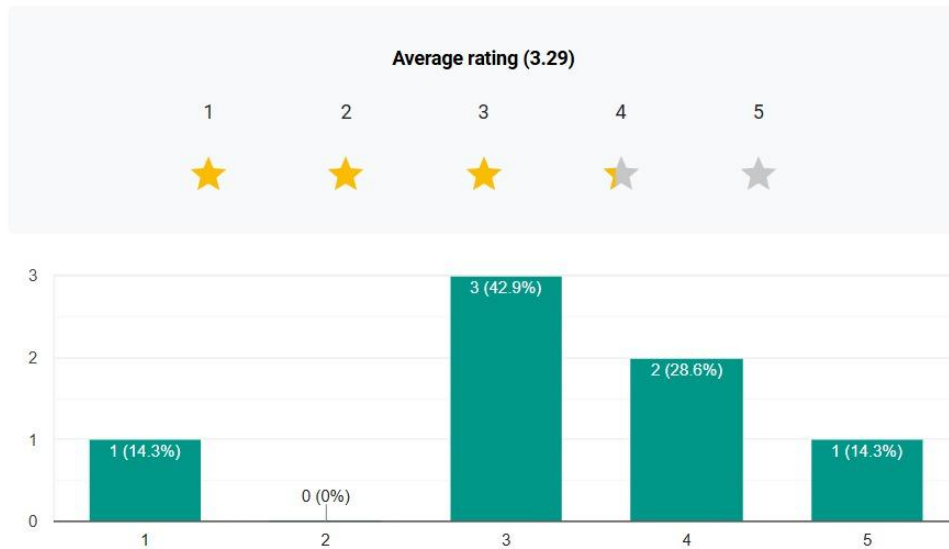
7 responses

Figure 3.10.2.22: Questionnaire Response 22

How would you feel if you were able to post announcements or reminders to students directly through the portal?
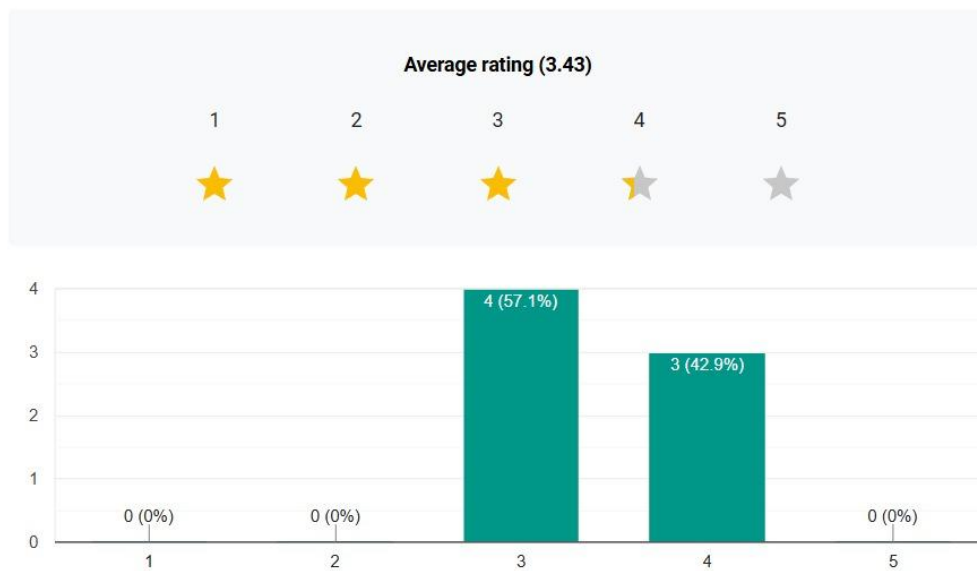
7 responses

Figure 3.10.2.23: Questionnaire Response 23

How would you feel if you could schedule and manage assessments from within the portal?

7 responses

Figure 3.10.2.24: Questionnaire Response 24

Have you experienced any problems when using the portal?
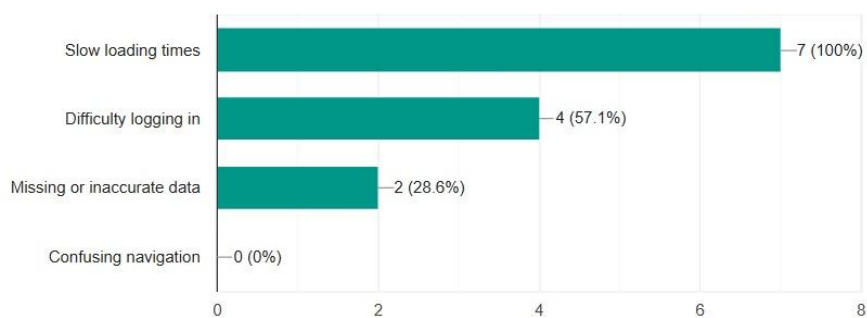
7 responses

Figure 3.10.2.25: Questionnaire Response 25

How important is mobile access to the portal for your work?

7 responses

Copy chart

Average rating (3.43)

1	2	3	4	5
★	★	★	★	★

0 (0%) — 1
1 (14.3%) — 2
4 (57.1%) — 3
0 (0%) — 4
2 (28.6%) — 5

Figure 3.10.2.26: Questionnaire Response 26

What features would you like to improve or add?

7 responses

Timetable and class reminders

Notification alerts for grading deadlines

As everyone is busy with deadlines and daily activities, the support system such as Campus support systems or EMS need to be updated and the Internet frequency must be high tech.

Simplified attendance marking system

Easy access to past student records

None

Auto-generated student performance summaries

Figure 3.10.2.27: Questionnaire Response 27

What are your main tasks when using the university portal?

4 responses

Copy chart

Managing classroom booking requests — 3 (75%)
Approving or rejecting requests — 3 (75%)
Viewing student or lecturer schedules — 1 (25%)
Sending out announcements — 2 (50%)
Monitoring portal activity — 2 (50%)
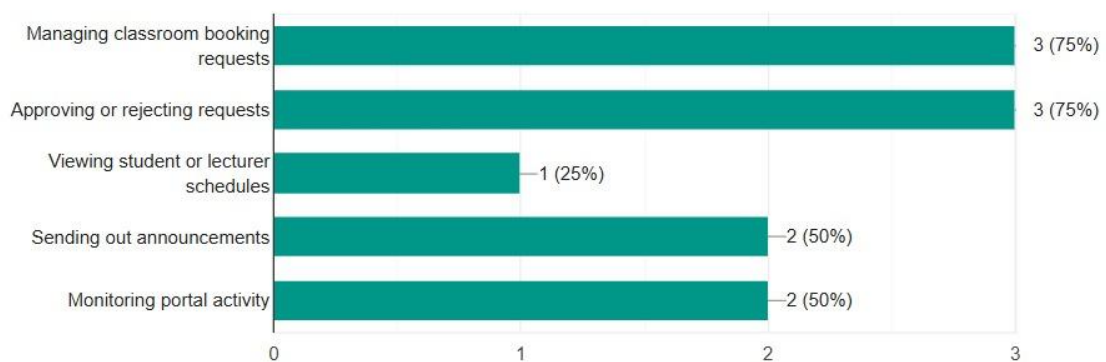
Figure 3.10.2.28: Questionnaire Response 28

Is it easy to manage and update request statuses?

4 responses
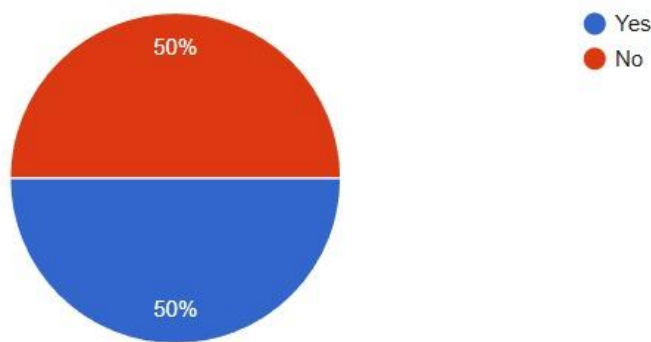
Figure 3.10.2.29: Questionnaire Response 29

How would you feel if you had a dashboard to track unresolved student issues (e.g., appeals, complaints, pending verifications)?

4 responses

Figure 3.10.2.30: Questionnaire Response 30

How would you feel if the portal allowed you to send mass announcements to targeted student groups or departments?
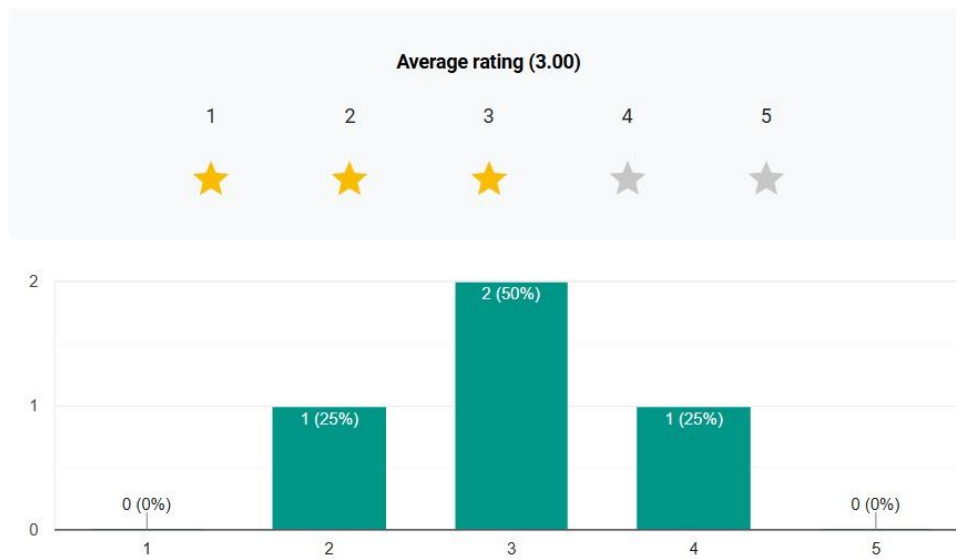
4 responses

Figure 3.10.2.31: Questionnaire Response 31

What features would you like to improve or add?

4 responses

Internal messaging system for staff

Easier approval process for booking requests system

Better dashboard for tracking activity

Faster login without repeated verification

Figure 3.10.2.32: Questionnaire Response 32

3.10.3 Interview

To collect in-depth qualitative feedback, a brief one-on-one interview was held with a student stakeholder. The purpose was to explore everyday interactions with the current university portal, identify functional challenges, and assess interest in potential new features using a Kano-style inquiry.

Interview Details:

- Participant: 1 student (Participant 01)
- Role: Regular portal user
- Duration: Approximately 5 minutes
- Method: Audio recording (camera declined for privacy)

Key Insights:

- The student primarily uses the portal for accessing billing information, academic records, timetables, and university announcements.
- Common frustrations include the repetitive OTP verification process and slow system responsiveness during login.

Suggested Improvements:

- Include a "Remember Me" option to streamline the login experience.
- Provide confirmation emails upon successful tuition or fee payments.

Features the Student Appreciated Most:

- A centralized dashboard combining attendance, grades, and billing in one place.
- SMS notifications for important updates such as approaching deadlines or released results.
- A clear and well-organized timetable interface for classes and exams.

Unexpected but Welcomed Idea (Delighter):

- Introducing the option to purchase MMU parking stickers online to avoid physically queuing at university offices.

Link to the interview:

https://drive.google.com/file/d/11id5Mvk2kyyic8F7EqLziCZ_IXjenjQ3/view?usp=sharing

3.10.4 Prototyping

To validate the usability and layout of the University Communication and Services Portal, a set of low-fidelity prototypes was created targeting the student user role. The goal was to visualize key interfaces, test navigation flow, and gather preliminary feedback on feature accessibility and clarity before development.

The prototypes were designed using Figma and focused on core pages that reflect the main use cases for students.

Pages Developed:

- Login Page – Secure sign-in interface with fields for MMU credentials
- Dashboard Page – Centralized summary of announcements, grades, timetable, and quick links
- View Grades Page – Tabular format of course results with GPA summary
- View Attendance Page – Attendance breakdown by course with absence alerts
- View Timetable Page – Weekly calendar view with filters for class and exam schedules
- View Billing Info Page – Overview of payment history, upcoming dues, and receipt downloads
- Book Classroom Page – Booking form with date/time picker and facility options
- View Announcements Page – Feed of campus-wide notices and academic updates

Activity details:

- Platform: Figma
- Duration: 3 days of design iterations
- Reviewers: Internal project team and two student testers
- Feedback method: Verbal walkthrough and comment pins in Figma

Key Feedback Highlights:

- Navigation was intuitive; testers liked the clean layout and role-based flow
- Suggested adding filters for announcements (e.g., urgent, academic, billing)
- Recommended that booking confirmation appears immediately after submission
- Interest in a color-coded timetable to separate lectures and assessments

Below are the screenshots of all Figma pages.

Figure 3.10.4.1: User Log In Page

Figure 3.10.4.2: User Log In Page with Error Message

Figure 3.10.4.3: Student Dashboard Page

Figure 3.10.4.4: Student View Academic Records Page

Figure 3.10.4.5: Student View Grades Page

Figure 3.10.4.6: Student View Attendance Page

View Timetable

Current Timetable

	MON	TUE	WED	THUR	FRI	SAT	SUN
8am.-10am.							
10am.-12pm.	CSE6224 - TC1L Software Requirements Eng Type: Lecture Venue: MPH CNMX1005	CSE6234 - TT4L Software Design Class: Tutorial Venue: FCI Building CQCR2003					
12pm.-2pm.	CSE6234 - TC2L Software Design Type: Lecture Venue: FCI Building CQCR2003			CSE6224 - TC1L Software Requirements Eng Type: Tutorial Venue: FCI Building CQAR1003			
2pm.-4pm.		CMA6134 - TC1L Computational Methods Class: Lecture Venue: MPH CNMX1005					
4pm.-6pm.							

Figure 3.10.4.7: Student View Attendance Page

Campus Finances

Search for trimester   [Make Payment]

Date	Trimester Term	Transaction term	DueDate	Total Fee
10/04/2025	Trimester March/April 2025	2510	07/07/2025	RM10995.70
12/01/2025	Trimester October/November 2024	2410	10/02/2025	RM9975.66
17/08/2024	Trimester July/Aug 2024	2412	04/10/2024	RM7511.44

Figure 3.10.4.8: Student View Billing Page 1

Campus Finances

Trimester March/April 2025

Print Bill

Owe Amount: RM10995.70

Date	Invoice Number	Item	Subject	Trimester Term	Transaction Term	DueDate	Charge(RM)	Status
20/04/2025	MMUINV000000 000072436	Hardcopy Transcript Fee		Trimester March/ April 2025	2510	20/04/2025	+10.00	Paid
10/04/2025		MMU Alumni Discount		Trimester March/ April 2025	2510	10/04/2025	-1056.56	Discount
10/04/2025	MMUINV000000 000072436	Hostel Fee B.C.S L C		Trimester March/ April 2025	2510	10/04/2025	+1166.66	Unpaid
10/04/2025	MMUINV000000 000072436	Program Fee B.C.S L C - SOFTWARE REQUIREMENTS ENG	SOFTWARE REQUIREMENTS ENG	Trimester March/ April 2025	2510	10/04/2025	+2516.40	Unpaid
10/04/2025	MMUINV000000 000072436	Program Fee B.C.S L C - SOFTWARE DESIGN	SOFTWARE DESIGN	Trimester March/ April 2025	2510	10/04/2025	+2516.40	Unpaid
10/04/2025	MMUINV000000 000072436	Program Fee B.C.S L C - COMPUTATIONAL METHODS	COMPUTATIONAL METHODS	Trimester March/ April 2025	2510	10/04/2025	+2516.40	Unpaid
10/04/2025	MMUINV000000 000072436	Program Fee B.C.S L C - ALGORITHM DESIGN AND ANALYSIS	ALGORITHM DESIGN AND ANALYSIS	Trimester March/ April 2025	2510	10/04/2025	+2516.40	Unpaid
10/04/2025	MMUINV000000 000072436	Program Fee B.C.S L C - RECREATION SPORTS	RECREATION SPORTS	Trimester March/ April 2025	2510	10/04/2025	+500.00	Unpaid
10/04/2025	MMUINV000000 000072436	Trim Fee B.C.S L C		Trimester March/ April 2025	2510	10/04/2025	+160.00	Unpaid

Sidebar: Main, Personal Information, University Subjects, Academic Records, Campus Finances, Campus Lifestyle, Announcements, Log out

Figure 3.10.4.9: Student View Billing Page 2

Class Booking

Make a book

Booking History

Date	Booking Type	Booking Description	Venue	Booking Date	Time	Approved Status
23May2025	Presentation	Record presentation for assignment	FCI CQAR2004	26May2025	4pm-6pm	Pending
16May2025	Record Assignment	Record video for Integrity subject assignment	MPH CNMX1004	22May2025	8am-4pm	Approved
17Sept2024	Tech Carrier Day	Given job opportunity eho those want to applied for intern with some great company here	DTC	21Nov2024	7am-6pm	Rejected Reason: Theres other event ongoing there.

Sidebar: Main, Personal Information, University Subjects, Academic Records, Campus Finances, Campus Lifestyle, Announcements, Log out

Figure 3.10.4.10: Student Book Class Page

Figure 3.10.4.11: Student Announcements Page

3.10.5 Perspective-Based Reading

The table below outlines the features, feedback, and user-role-specific concerns derived from Perspective-Based Reading (PBR) conducted on early drafts of the myMMU University Communication and Services Portal. This technique involved internal reviewers role-playing as different stakeholder types — students, lecturers, parents, and admins — to evaluate draft requirements, mockups, and scenarios.

This process ensured that the system's design aligns with each role's expectations and highlights overlooked needs or inconsistencies. The findings were derived from multiple sources, including questionnaire results, interview feedback, and prototype reviews.

Table 3.10.5: Perspective-Based Reading Table

Features / Requests / Opinions	Description	Requirement ID
Extended Sign-In Session	Students requested longer login durations and a 'Remember Me' feature to reduce frequent re-authentication.	REQ_UCSP001
SMS Notification Settings	Parents highlighted the need for configurable SMS alert preferences to avoid unwanted messages.	REQ_UCSP002
Bulk Grade Upload	Lecturers suggested having an option to upload student grades in bulk and reuse previous announcement drafts.	REQ_UCSP003
Booking Request Status Visibility	Admins identified the lack of status indicators for pending classroom bookings and requested a clearer interface for managing them.	REQ_UCSP004
Dashboard Consolidation	Students expressed interest in a centralized dashboard combining attendance, grades, announcements, and billing information.	REQ_UCSP005
Assessment Calendar Sync	Lecturers requested syncing assessment schedules with the existing timetable to avoid clashes and improve planning.	REQ_UCSP006
Internal Communication System (Admin)	Admins proposed a built-in messaging system to respond to student inquiries directly within the portal.	REQ_UCSP007

4.0 Verification

4.1 Verification Approach

This section outlines how the system will be verified during development. It describes the testing methods, responsible team members, timeline, and environment used to ensure that the system meets its intended requirements.

- How:
  Functional testing, unit testing, and basic integration testing will be conducted to verify core features such as login, grade viewing, SMS alerts, and booking flows.

- Who:
  Verification will be carried out by the development team members themselves, using shared checklists and manual testing to validate system behavior.

- When:
  Testing will occur at the end of each completed module (e.g., after implementing login, attendance, etc.) and during integration week before submission.

- Where:

All verification activities will be performed in a local development environment using test data, with simulated API connections where applicable.

4.2 Verification Criteria

The following criteria define how the software's compliance with the specified functional and quality requirements will be verified:

- Login response time must be less than 2 seconds under normal load.
- The grade report download must complete within 5 seconds for a file size under 1MB.
- SMS notifications must be triggered and sent within 1 second after the system event (e.g., low attendance alert).
- Classroom booking confirmations must be reflected immediately after submission, with response time not exceeding 2 seconds.
- The system shall maintain 99.9% uptime, excluding planned maintenance. All submitted forms (e.g., fee payment confirmations, support inquiries) must display a success or failure message upon submission.

4.3 Requirement Verification

In this section, we outline the planned verification approaches and methods for validating the software functionality of myMMU. The verification process is aligned with key development milestones and includes details on the method used, responsible team members, timing of activities, and testing environments.

4.3.1   Functional Requirements Verification

Table 4.3.1.1: Functional Requirements Verification Table

Requirement ID	Method	Responsibility	Event-based Timing	Venue/Environment
REQ_V001	Review and Inspection	Development Team	After requirement documentation is complete	Online meeting & GitHub
REQ_V002	Unit Testing	Individual Developer	After implementing each feature module	Local Dev Environment
REQ_V003	Integration Testing	Entire Team	After connecting major modules (e.g., login + grades)	Staging Environment
REQ_V004	System Testing	All Members	Before system handoff/submission	Staging Environment

4.3.2   Performance Requirements Verification

Table 4.3.2.1: Performance Requirements Verification Table

Requirement ID	Method	Responsibility	Event-based Timing	Venue/Environment
REQ_V005	Performance Benchmarking	Team Leader	After integration testing	Local environment
REQ_V006	Load Testing	Volunteer member	Before demo/presentation day	Staging Environment
REQ_V007	Stress Testing	Volunteer member	Before demo/presentation day	Staging Environment

4.3.3 Security Requirements Verification

Table 4.3.3.1: Security Requirements Verification Table

Requirement ID	Method	Responsibility	Event-based Timing	Venue/Environment
REQ_V008	Security Review & Checklists	All Team Members	Before submission	GitHub and shared documents
REQ_V009	Manual Vulnerability Check	Assigned member	After system testing	Local or shared device
REQ_V010	Secure Code Review	Developer for each module	Before merging code branches	GitHub / VS Code

4.3.4 Usability Requirements Verification

Table 4.3.4.1: Usability Requirements Verification Table

Requirement ID	Method	Responsibility	Event-based Timing	Venue/Environment
REQ_V011	UI/UX Feedback Testing	All Team Members	After interface completion	Browser-based testing
REQ_V012	End-User Trial (Peer Testing)	Friends/Peers	Pre-submission week	User Devices

4.3.5 Maintainability Requirements Verification

Table 4.3.5.1: Maintainability Requirements Verification Table

Requirement ID	Method	Responsibility	Event-based Timing	Venue/Environment
REQ_V013	Code Review	All Team Members	Ongoing throughout development	GitHub pull requests
REQ_V014	Version History Review	Team Leader	Before submission	GitHub repository

4.3.6   Portability Requirements Verification

Table 4.3.6.1: Portability Requirements Verification Table

Requirement ID	Method	Responsibility	Event-based Timing	Venue/Environment
REQ_V015	Cross-device Testing	All Members	Before submission	Various devices (laptops, phones)
REQ_V016	Browser Compatibility Testing	Assigned tester	Before submission	Chrome, Firefox, Safari, Edge

5.0 Appendices

5.1 Assumptions and Dependencies

This system will operate under a set of assumptions and dependencies that may impact its implementation and usage. These considerations are necessary to define the scope and expectations for development and deployment.

Assumptions:

1. The system assumes that students, lecturers, administrators, and parents will not manually register accounts within the portal, as user accounts will be pre-generated and distributed by the university via official communication channels (e.g., institutional email).

2. We assume that the university's Campus Management System (CMS) provides up-to-date academic data (e.g., grades, attendance, billing) and allows secure integration with external systems like the portal.

3. The project assumes that SMS gateway services will remain reliable and available throughout development and operation for sending time-sensitive alerts.

4. We assume users will have access to stable internet connections and modern web-enabled devices to access the system with full functionality.

5. It is assumed that the university has sufficient technical and financial resources to deploy, monitor, and maintain the portal securely and consistently.

6. We assume that users (especially parents) are willing to use the system to monitor their children's academic performance, billing status, and attendance.

Dependencies:

1. Availability of internal university IT staff and developers to implement, test, and maintain the system modules.

2. Timely access to APIs and data from the Campus Management System and SMS Gateway for integration purposes.

3. Collaboration with university departments (e.g., Registrar, Finance, Academic Affairs) to define data formats, schedules, and update cycles.

4. Existing university authentication infrastructure must support account-based access using issued student/lecturer/parent credentials.

5. Stability and availability of the SMS Gateway and third-party notification service providers, which are essential for real-time messaging features.

5.2 Acronyms and Abbreviations

Table 5.2: Acronyms Table

Acronym	Full Form	Description
CMS	Campus Management System	Backend university system that stores academic, billing, attendance, and timetable data.
SRS	Software Requirements Specification	A formal document that outlines the system requirements and specifications.
UI	User Interface	The graphical layout and elements with which users interact within the system.
OTP	One-Time Password	A single-use password sent to users for authentication purposes.
API	Application Programming Interface	A set of rules that allow the system to communicate with external services like CMS and SMS Gateway.
SMS	Short Message Service	A communication protocol for sending text messages to mobile devices.
MMU	Multimedia University	The institution where the portal is being deployed.
PBR	Perspective-Based Reading	A requirements validation technique involving role-based scenario reviews.
WCAG	Web Content Accessibility Guidelines	Standards ensuring digital accessibility for users with disabilities.
PDPA	Personal Data Protection Act	A Malaysian law regulating the processing of personal data.
UUID	Universally Unique Identifier	A 128-bit label used for identifying information in computer systems.
CRUD	Create, Read, Update, Delete	The four basic functions of persistent storage in software applications.

5.3 Glossary

Table 5.3: Glossary Table

Term	Definition
Actor	Any user or external system that interacts with the portal (e.g., student, parent, lecturer, admin).
Booking	A request made by a student to reserve a classroom for academic purposes.
Dashboard	A personalized homepage where users access key information such as grades, attendance, and announcements.
Module	A self-contained component of the system that delivers specific functionality (e.g., Academic Records Module, SMS Notification System).
Notification	A system-generated message sent to users to alert them about specific events (e.g., fee due, new grades).
Pin Feather	In the context of the project metaphor (e.g., documentation aesthetics), a minor but essential refinement or detail needing attention.
Use Case	A description of a system's behavior as it responds to a request from an actor.
Validation	The process of checking that the system meets the needs and expectations of users.
Verification	The process of ensuring that the software conforms to its specifications.
Stakeholder	An individual or group with an interest in the system's development and outcomes (e.g., MMU management, faculty, students, parents).

Change Log Table

Version	Date	Author	Changes Made
v1.0	23 May 2025	Teoh Xuan Xuan	Added project cover page; created version history log table
v1.1	24 May 2025	Teoh Xuan Xuan	Update Project Title and Table of Content
v1.2	24 May 2025	Teoh Xuan Xuan	Update 1.0-2.0 content
v1.3	25 May 2025	Yang Jia En	Update 3.6 and 3.10 Content
v1.4	25 May 2025	Teoh Xuan Xuan	Update 3.0, 4.0 & 5.0 content
v1.5	25 May 2025	Yang Jia En	Update 5.2 and 5.3 content
v1.6	25 May 2025	Teoh Xuan Xuan	Check alignment, header, etc.
v1.7	25 May 2025	Yang Jia En	Changed font to Times New Roman