Software Requirements Specification
for
BUP Student Portal

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Contents

Revision History

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Chapter 1

Introduction

1.1 Purpose

The Student Portal Application is designed to give students with a central digital platform that combines academic, administrative, and campus-related functions into a secure and user-friendly interface. It allows students to conveniently access their course history, compute CGPA, track attendance, examine exam results, and handle invoices and payments, while also serving as a hub for course materials, teacher information, and key reminders. In addition, the portal facilitates campus life by delivering announcements, event updates, exam schedules, lost and found services, and maintenance request filing. By combining these characteristics, the system increases productivity, minimizes human effort, and provides students with a consistent digital experience throughout their academic path.

1.2 Product Scope

1.2.1 Purpose

The Student Portal Application is designed to provide a single, integrated digital platform that enables students to efficiently manage their academic records, financial transactions, campus services, and communication with faculty and administration. It streamlines essential tasks such as tracking course history, viewing exam marks, managing attendance, accessing learning resources, and downloading admit cards, while also supporting campus-related needs like notices, events, and maintenance requests.

1.2.2 Benefits and Objective

The Student Portal offers several key benefits:

- **Efficiency:** Reduces the need for manual processes by automating academic and administrative tasks.
- **Transparency:** Provides students with accurate and real-time updates on academic progress, payments, and attendance.
- **Accessibility:** Ensures students can access their data anytime, anywhere, using secure authentication with their Edu-mail accounts.
- **Engagement:** Enhances student participation through feedback forums, reminders, and campus life support features.
- **Centralization:** Consolidates multiple services like academic, financial, and administration into one user-friendly platform.

Objectives:

- Provide a seamless user experience for students.
- Improve communication between students and university administration.
- Support academic success by giving students tools to track and manage their learning progress.

1.3 Intended Audience

The Software Requirements Specification (SRS) for the Student Portal System is designed to address the needs of a diverse audience involved in the development, deployment, and use of the system. The primary stakeholders include:

- **University Administrators:** responsible for managing academic operations, student records, and notices.
- **Faculty Members:** responsible for posting course materials, assignments, grades, and feedback.
- **Students:** the main users who will interact with the portal for academic resources, schedules, marks, and communication.
- **Project Managers (PMs):** overseeing the development and ensuring the project aligns with scope, timeline, and quality requirements.
- **Developers:** responsible for coding, implementing, and integrating the features of the Student Portal.
- **QA/QC Engineers:** ensuring the quality, performance, and reliability of the system through testing and validation.
- **Testers:** verifying that the system's features and workflows behave as expected.

By tailoring information to each group's specific needs, the SRS aims to foster a shared understanding among the diverse stakeholders involved in the development and utilization of the Student Portal System.

1.4 Intended Use

The intended audience of our SRS has been declared in the previous section. In this section, we describe how each group can use the SRS for better understanding:

1.4.1 University Administrators

- They will use the SRS to understand system requirements related to academic data management, fee records, and administrative announcements.
- They ensure that institutional policies are aligned with system functionalities.

1.4.2 Faculty Members

- Faculty use the SRS to understand features for uploading study materials, assignments, exam schedules, and grades.
- They also review feedback forms and ensure evaluation methods are captured in requirements.

1.4.3 Students

- Students use the SRS to visualize how they will access attendance, schedules, exam results, fees, library resources, and notices.
- Their expectations ensure the portal remains student-centric.

1.4.4 Project Managers (PMs)

- PMs refer to the SRS to define scope, assign tasks, and track project progress.
- They ensure development aligns with student and faculty needs.

1.4.5 Developers

- Developers use the functional requirements to implement features.
- They refer to constraints and dependencies during coding.

1.4.6 QA/QC Engineers

- QA/QC Engineers use the SRS to design test cases based on functional and non-functional requirements.
- They ensure features like performance, reliability, and security are met.

1.4.7 Testers

- Testers utilize the SRS to validate that all student features work as expected.
- They create scenarios for both normal and edge cases.

1.5 Risk Definition

The Software Requirement Specification of risk in potential that users may not fully adhere to platform policies, terms of use, or ethical guidelines. This non-compliance could lead to issues reported to administrators, impacting the seamless experience intended for all participants and potentially compromising the overall integrity of the Student Portal

1.5.1 User Inactivity

Risk that users (both students and faculties) may not actively participate, potentially affecting the collaborative community-building aspect and the overall success of the platform.

1.5.2 Administrator Workload

Risk that administrators may face a high workload, especially in handling user issues and enforcing policies, potentially impacting the seamless experience for participants.

1.5.3 Limited User Reference

Risk that users may not refer to the SRS directly, potentially resulting in a disconnect between their expectations and the delivered system.

1.5.4 Changes in Project Scope

Risk that unforeseen changes in project scope and requirements may not be promptly reflected in the SRS, leading to potential misguidance for developers, testers, and project managers.

1.5.5 Security Vulnerabilities

Risk that potential security vulnerabilities may arise, posing a threat to user data, financial transactions, and the overall integrity of the platform, necessitating robust security measures.

Chapter 2

Overall Description

2.1 User Classes and Characteristics

In this Student Portal system, user classes can be distinguished to cater to the specific roles and needs of Students, faculties, and administrators.

2.1.1 User Class: Students

Characteristics:

- Students are the primary end user of the portal
- Students access personal academic information such as profiles, course history, attendance, class routine, admit card, exam schedule, exam results, GPA, and billing/payment status.
- Students get access to course-related resources like Books, Lecture Slides, Faculty Information, Assignments through Student CourseKit.
- Students stay informed about their attendance status with Attendance percentage calculator.
- Students can calculate their predicted CGPA using CGPA Calculator
- Students can submit feedback on course and faculty before Mid Term and Final Exam
- Students stay informed about university activities by following notices, events, and updates posted on the platform.
- Students may use the digital board feature to report or find lost items such as ID cards or accessories.
- Students may report campus related various issues with pictures and location using Campus Maintenance request
- Students get information what Books they borrowed from Library and the Deadline of Return through My Library Resource

2.1.2 User Class: Faculty

Characteristics:

- Faculty members engage with students by posting course materials, notices, or important announcements.

2.1.3 User Class: Administrators

Characteristics:

- Administrators have full system control, with access to all management features.
- Administrators create, update, and manage user accounts (students and faculty), ensuring accuracy, compliance, and security.
- Administrators oversee course allocations, semester updates, examination schedules, and billing system integration.
- Administrators manage announcements and events notifications that appear on the platform.
- Administrators monitor system activity to ensure smooth operation, resolving issues raised by students or faculty.
- Administrators implement and manage security measures to safeguard user data, financial transactions, and the overall integrity of the platform.

Tailoring the system to these user classes ensures that students and faculty experience an efficient, user-friendly academic portal, while administrators retain the tools necessary to maintain, monitor, and enhance the overall functionality of the platform.

2.2 User Needs

The Student Portal system is designed to meet the unique needs of different user classes. Each class has distinct requirements that the portal must address for smooth and efficient operation.

2.2.1 Student Needs

- Easy access to personal academic information.
- CourseKit is centralized to access lecture slides, books, faculty details, and assignments.
- Tools like Attendance Calculator and CGPA Calculator for academic tracking and prediction.
- Ability to submit feedback on courses and faculty before Mid-term and Final exams.
- Digital Board for reporting/finding lost items.
- Campus Maintenance Request with photo and location support to report issues.
- A secure platform for billing/payment status updates.

2.2.2 Faculty Needs

- Ability to upload and manage course materials.
- Posting of notices, events, and announcements for students.
- A medium for engaging with students effectively through the portal.

2.2.3 Administrator Needs

- Full control over system management with secure access.
- Tools to create, update, and manage user accounts (students and faculty).
- Management of course allocations, semester updates, exam schedules, and billing system integration.
- Ability to post and monitor announcements and events.
- Monitoring system activity to ensure performance, compliance, and smooth operation.
- Tools to handle and resolve issues raised by students or faculty.
- Strong security measures to safeguard user data, transactions, and platform integrity.

2.3 Operating Environment

This section outlines the hardware, software, and network conditions required for the software to function correctly, with a focus on a mobile application using a local SQLite database.

2.3.1 Hardware Platform

The application runs on mobile devices, and its performance depends on the device's capabilities.
Mobile Devices:

- iOS: iPhone 6S and newer, or an equivalent iPad model.
- Android: Devices running a minimum hardware configuration, including an ARM-based processor, 4 GB of RAM, and sufficient internal storage for the application and its database files. SQLite is lightweight and has minimal hardware requirements, but a modern CPU ensures smooth performance for data-intensive operations.

2.3.2 Operating System and Versions

The application is designed for a mobile-first user base and is compatible with the following operating systems.

- iOS: iOS 13 and above.
- Android: Android 9.0 (Pie) and above.

2.3.3 Software Components and Applications

The application operates as a standalone mobile app and uses an embedded database. Unlike client-server databases, SQLite is a library that is linked directly with the application, so there is no separate database server process. The following components are critical for its operation:

- Core Libraries: The app will utilize the native SQLite library available on both Android and iOS platforms.
- Development Tools:
  - Visual Studio Code (latest stable version)
  - Android Studio (latest stable version)
  - Xcode (latest stable version)
  - A cross-platform framework React Native will be used to streamline development for both platforms.

2.3.4 Database Compatibility

The application uses SQLite as its local, embedded database solution.

- SQLite: The application is built around SQLite (latest stable version), which is included in both the Android and iOS operating systems. SQLite is a serverless, self-contained, and transactional SQL database engine that stores the entire database in a single file on the device's local file system.

2.3.5 Interoperability

While SQLite is an embedded database and doesn't directly interoperate with external systems like a traditional client-server database, the application itself will use APIs to communicate with other services.

- The system may use RESTful APIs and adhere to JSON data interchange standards for compatibility with third-party services and applications, such as for data synchronization or fetching remote content.

2.3.6 Network Requirements

The application's core functionality, which involves interacting with the local SQLite database, does not require an internet connection. However, an internet connection may be necessary for non-core features.

- The system requires a stable internet connection with a minimum bandwidth of 5 Mbps for any features involving data synchronization with a remote server, downloading updates, or accessing external APIs.
- It supports both cellular data and wireless network connections for these optional features.

2.3.7 Security Considerations

Security for a mobile app with a local SQLite database is crucial, especially regarding data stored on the device.

- The system employs Transport Layer Security (TLS) encryption for secure data transmission whenever the application communicates with an external server.
- All sensitive data stored in the local SQLite database will be encrypted at rest to protect it from unauthorized access if the device is lost or compromised. This may involve using an encryption extension like SQLCipher or relying on the device's native file-system encryption features.
- The application will adhere to industry-standard security practices to prevent vulnerabilities like SQL injection attacks by using parameterized queries.
- It's compatible with mobile device firewalls and security software to ensure data protection.

2.4 Constraints

2.4.1 Technical Constraints

- Selection of frameworks and technologies must support features such as course history, exam marks, student profile, and academic dashboard with secure authentication.
- Scalability considerations for handling increasing student records (attendance, library resources, payment history, etc.).
- Integration of multiple modules (library, exam marks, billing, attendance, etc.) into a single portal requires compatibility among chosen technologies.

2.4.2 Time Constraints

- Development phases must follow milestones for delivering core features like Student Profile, Exam Marks, and Payment History before moving to secondary modules such as Feedback Forms and Lost & Found Board.
- Project completion timeline will depend on academic schedules and may require alignment with exam periods for testing certain features (e.g., exam schedules, performance stats).

2.4.3 Budget Constraints

- Allocation of budget for server hosting, database storage, and secure payment integration.
- Limited resources for extended testing and deployment may restrict use of premium third-party tools or APIs.

2.4.4 Regulatory and Compliance Constraints

- Compliance with data protection regulations to safeguard sensitive student information such as exam marks, payment details, and academic records.
- Adherence to institutional policies regarding storage and access of student data.

2.4.5 Resource Constraints

- Availability of skilled developers with expertise in secure payment systems, academic dashboards, and database management.
- Dependence on institutional input for providing accurate and up-to-date data such as exam schedules, course history, and attendance records.

2.5 Assumptions

The Software Requirement Specification assumes that users, including both students and faculty, will actively engage with the Student Portal for academic and administrative purposes, such as accessing resources, viewing schedules, submitting feedback, and managing their profiles. These assumptions form the basis for the seamless academic and campus-related processes envisioned for the Student Portal System.

2.5.1 User Participation

It is assumed that students and faculty members will actively participate in the portal by regularly accessing academic dashboards, checking notices, using the coursekit, and submitting feedback or maintenance requests.

2.5.2 User Proficiency

It is assumed that students, faculty, and administrators possess a basic understanding of mobile applications, enabling them to navigate and utilize the portal effectively without extensive training.

2.5.3 Administrator Authority

It is assumed that university administrators and authorized staff have the necessary skills and authority to manage, verify, and monitor all aspects of the Student Portal, ensuring accurate data, proper access control, and secure operations.

2.5.4 Document Accessibility

It is assumed that all intended stakeholders (students, faculty, administrators, developers, and testers) have access to the SRS document and can comprehend its content effectively, fostering a shared understanding of the project.

2.5.5 Document Relevance

It is assumed that the tailored information in the SRS accurately addresses the specific needs and concerns of each stakeholder group, including academic, administrative, and technical requirements.

2.5.6 Aligned Objectives

It is assumed that the requirements outlined in the SRS align with the objectives and expectations of developers, testers, project managers, stakeholders, and end-users, supporting a unified project vision.

2.5.7 Stakeholder Collaboration

It is assumed that there will be effective collaboration and communication among diverse stakeholders (students, faculty, administrators, and IT staff), allowing for a shared understanding and smooth execution of the Student Portal System.

2.5.8 Consistent Connectivity

It is assumed that users (students and faculty) will have reliable internet connectivity on their devices to ensure seamless access to academic resources, notices, payment systems, and other portal functionalities.

Chapter 3

Requirements

3.1 Functional Requirements

3.1.1 Student and Faculty Registration

As a student or faculty member, I want to register on the portal by providing my personal and institutional details so that I can gain verified access to the Student Portal and its features.

Success

- When a new user fills out the registration form with valid details, the system successfully records the information.
- If the details match university records, the account is marked as "Verified" and access is granted.
- The user receives a confirmation email or SMS to verify ownership of their corresponding mail or phone number).
- Duplicate accounts are prevented by checking University ID and email.
- Faculty accounts receive faculty-specific privileges.
- Student accounts receive student-specific access.

Failure

- If mandatory fields are left blank, the system shows "Please fill all required fields."
- If the email format is invalid, the system shows "Invalid email format."
- If the password does not meet security standards, the system wont allow it to continue.
- If the University ID does not match institutional records, the system rejects the registration.
- If the email or University ID is already registered, the system shows "User already exists."
- If the server is down, the system shows "Registration unavailable. Please try again later."

3.1.2 User Login

As a registered user, I want to log into the portal using my credentials so that I can get access to the system and its features securely.

Success

- If the user enters a valid email and password, they are redirected to their respective dashboard.
- If the user has selected "Remember Me", the system securely stores login information for faster access next time.
- Users are redirected to a password reset page if they click "Forgot Password" and successfully reset their password via email verification.

Failure

- If the email format is invalid, the system shows "Invalid email format."
- If the credentials are incorrect, the system shows "Incorrect username or password. Please try again."
- If the server is unavailable, the system shows "Service unavailable. Please try again later."
- If the session expires due to inactivity, the system redirects to the login page.

3.1.3 Academic Dashboard

As a student, I want to access my academic dashboard so that I can view my GPA/CGPA, attendance, and performance statistics along with my course schedule and academic calendar, ensuring I stay updated on both academic progress and important events.

Success

- The system displays overall performance including GPA, CGPA, and semester-wise results.
- Attendance statistics are shown in both percentage format and a visual calendar view.
- Performance trends (graphs/charts) are generated based on past semesters for easy analysis.
- The student can select a semester to view detailed course performance.
- The course schedule displays class times, subjects, and instructor details.
- The academic calendar highlights exams, assignment deadlines, university events, and holidays.
- Students can filter calendar events by type (exam, assignment, class, holiday).
- Notifications or reminders are sent for upcoming exams, deadlines, and scheduled classes.

Failure

- If grade or attendance data is missing, the system shows "Performance data not available."
- If GPA/CGPA calculation fails due to incomplete data, the system shows "Calculation error."
- If the course schedule is not uploaded, the system shows "No schedule available yet."
- If the academic calendar cannot load, the system displays "Calendar unavailable at this time."
- If reminders/notifications fail to send, the system logs an error and prompts the user to check manually.

3.1.4 Student Profile

As a student, I want to create and update my profile so that I can maintain accurate personal and academic information which will help me and the university keep track of my progress.

Success

- When the student logs in, the system displays their profile with basic info, academic details.
- Only Admin can edit student's profile fields (address, contact, etc.) and save changes successfully.
- Updated details are stored in the system and reflected immediately.
- If achievements are added, they appear under the "Achievements" section with date and description.

Failure

- If mandatory fields are left blank during profile update, the system shows "Please fill all required fields."
- If profile data is corrupted or missing, the system shows "Profile data not available."
- if an invalid format is uploaded (e.g., unsupported file/image for achievements), the system rejects it and prompts the user.

3.1.5 Student Coursekit

As a student, I want to access my coursekit so that I can download or view lecture slides, notes, reference books, and other course-related resources in one place, ensuring I have easy access to all my study materials.

Success

- If the student selects a course, the system displays a list of available resources along with course description and necessary information.
- When the student clicks on a resource, the file opens for preview. Downloading the file can also be done from there.
- Students can filter resources by type, which can be lecture slides, books, class notes, previous exam questions, etc. for quick navigation.
- The student receives a confirmation message when a resource is successfully downloaded.

Failure

- If no resources are uploaded for a selected course, the system shows "No resources available yet."
- If the network connection is lost while downloading, the system shows "Download failed. Please try again."

3.1.6 Course History

As a student, I want to see my course history so that I can check my past performance, view grades, and my CGPA.

Success

- When the student selects Course History, the system shows all finished courses with course code, title, credit, grade, and CGPA.

- The student can filter history by semester, grade, or course type.
- Course history data is always kept updated with completed results.

Failure

- If course history data is incomplete, the system shows “Some records are missing. Contact administration.”
- If the internet connection is lost, the system shows “Unable to load course history. Please try again.”

3.1.7 Current Exam Marks

As a student, I want to see my current exam marks so that I can track my performance in ongoing courses.

Success

- When the student selects Current Exam Marks, the system shows all CT marks, attendance marks, and assignment marks.
- The system also shows total marks with a clear breakdown (CT, attendance, assignment, mid term).
- When teachers upload new marks, the system updates and shows “Marks updated successfully.”

Failure

- If no marks are uploaded, the system shows “Marks not available yet. Please check later.”
- If the internet connection is lost, the system shows “Unable to load marks. Please try again.”

3.1.8 Attendance Summary

As a student, I want to view my attendance summary for each course so that I can easily track my progress and ensure I meet attendance requirements.

Success

- If the student selects a semester, the system displays all courses for that semester.
- For each course, the system shows the total number of classes, the number of classes the student was present for, and the number of classes the student was absent for.
- The system also displays the attendance percentage for each course.

Failure

- If the system fails to load the attendance data, it shows an error message: "Failed to load attendance data. Please try again."
- If the student tries to access the attendance summary without selecting a semester, the system displays a prompt asking them to "Please select a semester."

3.1.9 Notice Board

As a student, I want to access a digital notice board so that I can stay informed about important announcements, events, and deadlines.

Success

- The system displays a list of recent notices in a clear and organized format.
- Each notice includes a title, the date it was posted, and a brief description.
- The student can click on a notice to view the full details.
- The student can filter notices by different category for quicker navigation.
- The student can use a search bar to find specific notices by keyword.

Failure

- If there are no notices to display, the system shows the message: "No new notices at this time."
- If the system fails to load the notice board, it displays an error message: "Failed to connect to the notice board. Please check your internet connection and try again."
- If a search query returns no results, the system shows a message: "No notices match your search criteria."

3.1.10 Bill and Payment History

- As a student, I want to view my bill and payment history so that I can track my tuition and other fees clearly.
- As a student, I want to download or print my payment receipts so that I can keep a record for future reference.
- As a student, I want to get notifications about upcoming or pending payments so that I can avoid fines or late fees.

3.1.11 Course Evaluation and Feedback

- As a student, I want to submit course evaluations anonymously so that I can give honest feedback about my instructors and courses.
- As a faculty member, I want to review the summarized feedback so that I can improve my teaching methods and course materials.
- As an administrator, I want to collect and analyze student feedback so that I can make data-driven decisions about curriculum and faculty performance.

3.1.12 My Library Resources

As a student, I want to view the list of books I have borrowed along with their return deadlines so that I can track due dates and avoid late penalties.

Success

- The system displays a list of all currently borrowed books with details such as title, author, issue date, and return deadline.

- The student can view overdue items, if any, highlighted in the list.
- A notification is displayed for books that are approaching their due date.
- The student can download selected e-books and can access e-books directly in the portal using a built-in reader. with proper DRM protection.
- The student can search for any book in the library and see its availability status and location in the library (e.g., section, shelf number) so the student can find it easily.

Failure

- If no books are borrowed, the system shows a "No borrowed books" message.
- If the system fails to fetch records, an error notification is shown with a retry option.
- If e-book download fails due to DRM restrictions or network issues, an error message is displayed.
- If the search fails or the book is not found, the system shows error message.

3.1.13 Lost and Found Board

As a student, I want to use a digital board to report lost or found items so that I or others can reclaim them easily.

Success

- The student can post details about a lost or found item, including images, description, location, date, and optional contact information.
- The system stores the report and displays it on the shared Lost and Found Board for all students to see.
- Other students can browse the board and filter by item type or date.
- Students can mark an item as claimed/resolved when it is found.
- Students can chat privately with the poster of a lost/found item to coordinate returning or claiming it.
- Students can use Search functionality for lost board

Failure

- If mandatory fields are missing, the system prevents submission and shows an error message.
- If the system fails to store or retrieve reports, the student is notified with appropriate error message.
- If a photo upload fails due to size or format issues, an error message is displayed.
- If chat messages fail to send due to network issues or system errors.

3.1.14 Campus Maintenance Request

As a student or faculty member, I want to submit a campus maintenance request so that the university administration can resolve it in a timely manner. I also want to track the status of my request for transparency.

Success

- When a user submits a request with proper details, it is sent to the administrators for approval.
- If the request is valid, it is recorded successfully, and a unique Request ID is generated.

- The system forwards all valid request to the maintenance department and shows "Request submitted successfully."
- Users receive a notification when their request is acknowledged, assigned, in-progress, or resolved.
- Users can track the request status (Pending → In Progress → Resolved).
- Multiple users reporting the same issue get linked under one ticket to avoid duplication.

Failure

- If the request is invalid, the administrators reject the request and sends notification to the user.
- If required details are missing on request submission, the system shows a "Please fill out all the required fields" message.
- If the uploaded image is in an unsupported format or too large, the request submission is blocked until corrected.
- If the same user tries to submit duplicate requests for the same issue within 24 hours, the system merges them and informs the user.

3.2 Non Functional Requirements

1. **Performance Requirements**
   - The system should load the dashboard within 3 seconds under normal network conditions.
   - The system should handle at least 200 concurrent users without performance degradation.
2. **Security Requirements**
   - All sensitive data (marks, payment details, personal info) must be transmitted using HTTPS/TLS encryption.
   - Passwords and financial information must be stored in encrypted form.
   - Users should be automatically logged out after 10 minutes of inactivity.
3. **Reliability Requirements**
   - The system should perform without failure 95% of use cases.
   - In case of server failure, data should not be lost and the system should recover within 5 minutes.
4. **Availability Requirements**
   - The system should be available 99.5% of the time, excluding scheduled maintenance.
   - The system should allow students to see major functions even during server maintenance through offline caching.
5. **Usability Requirements**
   - The interface should follow consistent UI/UX guidelines for mobile apps.
   - The app should be intuitive so that new users can learn to use it within 5 minutes without training.
   - Key actions should be reachable within 3 taps.
6. **Portability Requirements**
   - The app must run on both Android and IOS devices.
   - The system should be compatible with at least the last 2 major OS versions for Android and IOS.

7. **Scalability Requirements**
    - The system architecture must support scaling to 1000+ users with minimal reconfiguration.
    - Additional modules should be easy to integrate without major redesign.
8. **Maintainability Requirements**
    - The codebase should follow modular design principles for easy updates and bug fixes.
    - All APIs and modules should be well-documented.
    - Changes to one module should not affect others.
9. **Accessibility Requirements**
    - The app should comply with basic accessibility standards.
    - Support for multiple languages should be considered in the design.

Appendices

Appendix A

Glossary