Student Attendance Management System

Team 7 Software Requirements Specification document

1. Introduction

1.1 Purpose:

The purpose of this document is to provide a detailed overview of the requirements for the development of a Student Attendance Management System. This software application is designed to efficiently track, monitor and manage student attendance within educational institutions.

1.2 Scope:

The scope of this project includes defining user roles, implementing access permissions, enabling teachers to manage attendance, ensuring accurate and transparent attendance recording, and prioritizing data privacy and security.

1.3 Intended Audience:

The intended audience for this document includes all stakeholders engaged in both the development and deployment phases of this system including:

- Admin: Administrator
- Faculty: Academic staff responsible for course teaching and grading
- Student: Individuals enrolled in the educational institution

2. Overall Description

2.1 Product Perspective:

The Student Attendance Management System is a web-based application that streamlines attendance management processes within educational institutions. It functions as an integral part of the educational ecosystem, providing a reliable and efficient solution to track, monitor and manage student attendance.

2.2 Product Features:

2.2.1 *User Authentication*:

- Secure login for administrators, faculty members and students.
- Role-based access control.

2.2.2 *Attendance Tracking*:

- Faculty can mark attendance for each class section.

2.2.3 *Student Profile Management*:

- Add, edit and delete student profiles.

- View Student attendance history.

2.3 **User Classes and Characteristics**:

2.3.1 *Administrator*:

- Responsible for configuring system settings.
- Authority to create, modify and deactivate user accounts within the system.
- Enforce institutional policies related to attendance management. This includes ensuring that teachers adhere to attendance recording standards and students have access to their attendance records.
- Serve as a communication hub between different stakeholders.

2.3.2 *Faculty*:

- Marks attendance for assigned classes.
- Accesses individual class and student attendance data.

2.3.3 *Students*:

- Access their own attendance records.
- Ability to track their attendance over specific periods, allowing them to identify patterns in their attendance behaviour.

2.4 **Operating Environment**:

The Student Attendance Management System operates within a standard computing environment that is accessible through web browsers. It relies on internet connectivity for real-time access and interaction. The underlying infrastructure should support the necessary security protocols for user authentication and encryption to ensure the privacy and integrity of attendance records.

2.5 **Design and Implementation Constraints**:

2.5.1 *Modular Design*:

- Design should be modular allowing for independent development and maintenance of components.
- Allows for easier facilitation of upgrades and replacements.

2.5.2 *Scalability*:

- Architecture should support scalability to accommodate potential increase in user database or data volume.
- Ensures that the system can handle growth without significance performance degradation.

2.5.3 *Flexibility*:

- System should be flexible to adapt to changing requirements.
- Includes the ability to integrate new features and functionalities seamlessly.

2.5.4 *Security*:

- Should be implemented to protect sensitive student data.
- Includes data encryption and secure user authentication to prevent unauthorized access.

2.5.5 *User-friendly Interface*:

- System should have a user-oriented, accessible and easy-to-use interface for the administrators, faculty members and the students interacting with the system.

2.6 **Assumptions and Dependencies**:

2.6.1 *Assumptions*:

- User Access: The users (teachers, administrators, students) have access to the necessary devices.
- Data Accuracy: The assumption that the data entered into the system is accurate and up-to-date. This could depend on the reliability of data entry by teachers or administrative staff.
- Hardware and Software: The availability of the required hardware (servers, computers) and software (database management systems, web servers) is assumed.
- Attendance Policies: The system is designed based on the existing attendance policies and procedures of the educational institution.
- User Training: Users are assumed to be trained adequately to use the system efficiently.
- Data Security: Assumption that the system incorporates adequate security measures to protect sensitive student information.

2.6.2 *Dependencies*:

- Internet Connectivity: The system depends on a stable internet connection for data access and updates.

- Integration with Student Database: The system might depend on accurate and updated information from the student database to function effectively.
- Administrative Approval: Implementation of the system depends on the approval and support of the education institution's administration.
- Compliance with Regulations: The system's functionality might depend upon compliance with educational regulations and data protection laws.

3. Specific Requirements

3.1 **External Interface Requirements**:

3.1.1 *User Interfaces*:

a) Administrator Interface

- Description: The administrator interface provides access to system settings and user management.
- Features:
  - Secure login with role-based access control.
  - Intuitive dashboard for system configuration.
  - Tools for managing users, roles and permissions.

b) Faculty Interface

- Description: The faculty interface enables academic staff to make attendance, view class details and access student profiles.
- Features:
  - Secure login with role-based access.
  - Intuitive attendance marking tools.
  - Easy navigation to view class and student details.

c) Student Interface

- Description: A simplified interface for students to view their attendance records and related information.
- Features:
  - Secure login for students.
  - Access to personal attendance history.
  - Tracking of individual attendance for various courses.

3.2 **Hardware Interfaces**:

- The hardware the system is intended to run on is required to me compatible with standard educational institution computers.
- Support for devices with various screen sizes.

3.3 **Software Interfaces:**

3.3.1 *Student Databases*:

- Description: Integration with existing student databases within the educational institution.
- Requirements:
  - Compatibility with the database management system used by the institution.
  - Secure data transmission and synchronization.

3.3.2 *Academic Systems*:

- Description: Integration with services such as course management.
- Requirements:
  - APIs for seamless data exchange.
  - Updates for class schedules.

3.4 **System Features**:

Feature 1: User Authentication

The User Authentication feature provides a secure login mechanism for administrators, faculty members, and students. It also implements role-based access control, ensuring that users can only access functionalities relevant to their roles.

Stimulus/Response Sequences:

- User navigates to the login page.
- System displays login fields for username and password.
- User enters their credentials and clicks "Login."
- System verifies the credentials and grants access based on the user's role.
- If login fails, the system displays an error message.

Functional Requirements:

- The system must provide a secure login mechanism.
- Different user roles (admin, faculty, student) must have role-based access control.
- The system must validate user input during login process.
- The system must display appropriate error message to users.

Feature 2: Attendance Tracking

The Attendance Tracking feature empowers faculty members to record attendance for each class section efficiently. The system offers manual entry method for marking attendance. Moreover, it includes the option to mark students as absent.

Stimulus/Response Sequences:

- Faculty selects the class section for attendance tracking.
- System displays the attendance interface.
- For manual entry, the system presents a list of students, and faculty marks them as present or absent.
- The system saves the attendance data for the class section.
- Faculty receives confirmation of successful attendance recording.

Functional Requirements:

- Faculty members must have the ability to mark attendance for each class section.
- There should be an option to mark students as absent.
- The system must validate and save the attendance data accurately.
- Confirmation messages must be provided to faculty upon successful attendance recording.

Feature 3: Student Profile Management

The Student Profile Management feature enables authorized users (administrators and faculty) to perform essential actions related to student profiles, including adding, editing, and deleting student profiles. Additionally, it provides the capability to view the attendance history of individual students.

Stimulus/Response Sequences:

- User selects "Add Student Profile" from the menu.
- System displays a form for entering student information, including name, student ID, contact details, and course enrollment.
- User enters the required student details and clicks "Submit."
- System validates the input and saves the new student profile.
- A confirmation message is displayed to confirm the successful creation of the student profile.
- User selects "Edit Student Profile" from the menu.
- System provides a search or selection interface to find the student profile to edit.
- User selects the student profile to edit and makes the necessary changes.
- User clicks "Submit" to save the updated profile.
- The system validates the changes and displays a confirmation message.
- User selects "Delete Student Profile" from the menu.
- System provides a search or selection interface to find the student profile to delete.
- User selects the student profile to delete.
- A confirmation message is displayed.
- User confirms the deletion, and the system removes the student profile.

- User selects "View Student Attendance History" from the menu.
- System presents a search or selection interface to find the student.
- User selects the student to view attendance history.
- The system retrieves and displays the student's attendance history, including dates, courses, and attendance status.

Functional Requirements:

- The system must allow users to add, edit, and delete student profiles.
- Student profiles should include essential information such as name, student ID, contact details, and course enrollment.
- The system must validate user input when creating or editing student profiles.
- Confirmation messages must be provided upon successful profile creation, editing, or deletion.
- Users must be able to view the attendance history of individual students, including relevant details.

3.5 **Non-functional requirements**:

Performance Requirements:

- The system should efficiently handle a large number of concurrent users, including administrators, faculty, and students.
- Response times for critical functions, such as login and attendance tracking, should be kept under 2 seconds to ensure a smooth user experience.
- Batch processes for data processing and reporting should complete within a reasonable timeframe, considering the system's scale.

Security Requirements:

- The system must prioritize data privacy and security, complying with relevant data protection regulations to safeguard attendance records and personal information.
- User data, including attendance records and personal information, should be encrypted using strong encryption methods.
- Robust authentication and authorization mechanisms should be implemented to control access to the system, ensuring that only authorized users can perform specific actions.
- Regular security audits and vulnerability assessments should be conducted to identify and address potential risks promptly.
- Reliability and Availability:
- The system must be highly reliable and maintain a high uptime to ensure uninterrupted attendance management.

- Backup and recovery mechanisms should be in place to mitigate data loss and minimize system downtime in case of failures.
- Maintenance and updates should be designed to have minimal impact on system availability, with scheduled maintenance windows communicated in advance to users.
- The system should be scalable to accommodate a growing number of students, faculty, and classes, ensuring availability as the institution expands.

Business Rules:

- Faculty members should have the ability to mark attendance for their assigned classes.
- Students should only be able to view their own attendance records, ensuring data privacy.
- Only authorized administrators and faculty members should have access to student profiles and attendance data.
- Attendance data should be accurate and reflect the actual attendance of students.
- Notifications and alerts should be sent to users based on predefined rules, such as low attendance or important announcements.
- Data should be retained according to institutional policies and legal requirements, and retention rules should be enforced by the system.

Software Quality Attributes:

- The user interfaces should be intuitive and user-friendly to facilitate ease of use for all types of users.
- The system should provide clear error messages and feedback to guide users in case of input errors or issues.
- The application should be responsive and compatible with various web browsers and devices, including mobile devices, to enable access from anywhere.
- The system should have a well-documented and easily maintainable codebase to simplify updates and improvements.
- Regular performance monitoring and optimization should be conducted to ensure the system's efficiency and responsiveness.

3.6 **Other requirements:**

Legal and Regulatory Requirements:

- Regulatory Compliance: The application must comply with all relevant data protection regulations and educational institution standards. It should adhere to laws applicable to the handling of personal and educational data.

- Data Privacy: To protect students' privacy, the system must ensure that all personal attendance data is anonymized or pseudonymized when necessary. This includes masking or encrypting sensitive data to prevent unauthorized access.
- Intellectual Property: The Student Attendance Management System should take into account any intellectual property rights or licensing requirements for third-party components used in the system. Ensure that proper licensing and permissions are in place for all software and resources integrated into the system.

Database Requirements:

- Database Management System: Specifying the database management system (DBMS) that will be used for storing student attendance data and related information. Ensuring compatibility with the chosen DBMS.
- Data Backup and Recovery: Define the mechanisms and frequency of data backups for student attendance records and system data. Describe the procedures and protocols for data recovery in case of system failures to minimize downtime and data loss.

Performance and Scalability:

- Scalability: The system should be designed to scale efficiently and to accommodate an increasing number of students, faculty members, and classes without significant performance degradation. It should handle growth in the user database and data volume seamlessly.
- Resource Utilization: Specify resource utilization goals, such as CPU and memory usage limits, to ensure the efficient operation of the system. The system should be optimized to use hardware resources effectively while providing responsive performance.

Maintenance and Support:

- Maintenance Plan: Describe the approach for handling bug fixes, updates, and enhancements to maintain system reliability while minimizing downtime.
- Support Channels: Define the accessible user communication channels for technical support and assistance, including email, phone, and online helpdesk.

Error and Logging:

- Error Handling: Outline the strategy for managing system errors and exceptions, including error codes, user-friendly error messages, and automated error reporting.

- Logging: Specify the types of data to be logged, such as debugging information, audit trails, analytics, and troubleshooting details, with a focus on data retention policies

4. Appendix

Glossary

- SRS – Software Requirements Specification
- DBMS – Database Management System