**Ex No :**

**Date :**

Attendance Management System

Software Requirements Specification Document

The Attendance Management System (AMS) for Colleges is designed to help colleges and universities manage student attendance more efficiently. The AMS will provide a user-friendly interface for instructors and administrators to manage student attendance and automate the manual process of attendance tracking. This system will be an essential tool for colleges and universities to manage student attendance and provide valuable insights for analysis.

**Contents**

**1 INTRODUCTION....................................................................................... 3**

1.1 DOCUMENT PURPOSE................................................................................................ 3

1.2 PRODUCT SCOPE......................................................................................................... 3

1.3 INTENDED AUDIENCE AND DOCUMENT OVERVIEW........................................ 4

1.4 DEFINITIONS, ACRONYMS AND ABBREVIATIONS............................................. 4

1.5 DOCUMENT CONVENTIONS......................................................................................4

1.6 REFERENCES AND ACKNOWLEDGMENTS........................................................... 5

**2 OVERALL DESCRIPTION....................................................................... 5**

2.1 PRODUCT PERSPECTIVE.............................................................................................5

2.2 PRODUCT FUNCTIONALITY.......................................................................................5

2.3 USERS AND CHARACTERISTICS...............................................................................5

2.4 OPERATING ENVIRONMENT......................................................................................6

2.5 DESIGN AND IMPLEMENTATION CONSTRAINTS.................................................6

2.6 USER DOCUMENTATION.............................................................................................6

2.7 ASSUMPTIONS AND DEPENDENCIES......................................................................6

**3 SPECIFIC REQUIREMENTS................................................................... 6**

3.1 EXTERNAL INTERFACE REQUIREMENTS...............................................................6

3.2 FUNCTIONAL REQUIREMENTS................................................................................ 7

**4 NON-FUNCTIONAL REQUIREMENTS................................................ 8**

4.1 PERFORMANCE REQUIREMENTS............................................................................ 8

4.2 SAFETY AND SECURITY REQUIREMENTS............................................................ 8

4.3 SOFTWARE QUALITY ATTRIBUTES.........................................................................9

**1. INTRODUCTION**

**1.1 DOCUMENT PURPOSE**

The purpose of a Software Requirements Specification (SRS) for an attendance management system is to clearly define the functional and non-functional requirements of the software, as well as any constraints, assumptions, and dependencies that must be considered during the design, development, and testing of the system. This document serves as a contract between the college and the development team, providing a detailed description of what the software is expected to do, how it will perform, and what it will look like. The specific purposes of an SRS for an attendance management system in a college include:

1. Describing the System Requirements: The SRS document provides a comprehensive description of the system requirements, including the functional requirements (features, capabilities, user interfaces) such as the ability to record attendance for multiple courses, class sections, and instructors.
2. Facilitating Compliance with Attendance Policies: The SRS document outlines how the attendance management system will facilitate compliance with college attendance policies, such as the ability to track student attendance, monitor absences, and generate reports.
3. Supporting Communication with Stakeholders: The SRS document describes how the attendance management system will support communication with various stakeholders, such as instructors, students, and administrators, through features such as email notifications, messaging, and reporting.
4. Supporting Campus-wide Deployment: The SRS document describes how the attendance management system will be deployed across the entire college campus, including hardware and software requirements, as well as any network or security considerations.
5. Supporting Integration with Existing Systems: The SRS document also describes how the attendance management system will integrate the LMS of SSN.

Overall, the purpose of this document is to ensure that the software meets the needs of the college, is of high quality, and is specifically addressing the unique requirements of a college environment.

**1.2 PRODUCT SCOPE**

The Software Requirements Specification captures all the requirements in a single document. The Attendance Management software aims at helping the user to address issues from multi-disciplinary angles related to Attendance management and services. This software helps to organize events without any paperwork and has a wide variety of modules. The Attendance Management System is supposed to have the following features :

1. Login function: The application provides any user with three types of login. One for the administrator, one for the instructor and one for the student. Any user needs to login, in order to avail the features of the application.
2. View Attendance: The system provides the student to view attendance marked by instructors of multiple courses over time.
3. Raise ticket: The student is provided with an option called raise ticket. If the instructor has wrongly marked the attendance record, the student may raise a query related to the above.
4. Apply for OD: The system provides the student to apply for OD. Whenever the student takes leave in connection with extracurricular activities, he/she may request attendance if his absence is considered valid.
5. Mark Attendance: The system provides the instructor with a list of courses he handles and a list of students in each course. The instructor is responsible for marking the attendance of each student for the entire duration of his course.
6. Approve ticket: The instructor is given the option to approve or reject the ticket raised by the student based on reasonable grounds.
7. Approve OD: This system gives the instructor the option to approve the OD received from the students after carefully checking the documents attached to the OD. The instructor changes the marked attendance once the documents are verified.
8. Register users: The system provides the administrator to register new instructors and students. He is responsible for assigning the courses to instructors and taking care of the entire system.
9. Set Attendance policies: The system provides the administrator to set, alter or remove the attendance policies.
10. Mailing facility: End users of this system will receive an email if attendance goes below the minimum mark.

**1.3 INTENDED AUDIENCE AND DOCUMENT OVERVIEW**

The intended audience of a Software Requirements Specification (SRS) for an attendance management system typically includes the development team, project stakeholders, and other interested parties, such as system administrators, end-users, and quality assurance personnel. The document provides a detailed description of the system's features, functions, and capabilities, as well as the technical, operational, and security requirements that must be met.

**1.4 DEFINITIONS, ACRONYMS, AND ABBREVIATIONS**

* SSN - Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam
* LMS - Learning Management System
* AMS - Attendance Management System
* SRS - Software Requirement Specification
* OD - On Duty
* Administrator: The in-charge who is responsible for setting attendance policies, adding new instructors and students, and handling attendance reports.
* Instructor: The in-charge who is responsible for marking attendance of the students, handling queries raised by the students and verifying the OD applications received from the students.
* Student: The end user who serves as a client views the attendance marked by the instructor, raises a query against marked attendance and applies for OD.
* Server: Machine that stores all the information and records.

**1.5 DOCUMENT CONVENTIONS**

The entire document is in Times New Roman font. The headings are numbered 1,2,3... and so on and sub-headings are numbered x.1,x.2.... and so on. Both headings and subheadings are in bold.

Main title: Font Times New Roman and size 14

Subtitles: Font Times New Roman and size 14

Content: Font Times New Roman and size 12

**1.6 REFERENCES AND ACKNOWLEDGMENTS**

Software Engineering book written by Roger Pressman, Ian Sommerville.

**2. OVERALL DESCRIPTION**

**2.1 PRODUCT PERSPECTIVE**

The AMS is a web application to be used by the college management to improve the efficiency of management, instructors, and students. The AMS to be developed benefits greatly the instructors and students of the institution. The web application provides facilities to instructors to mark attendance of students during class & reduce manual work. It is used to track student's attendance, absentee record, attendance history & other related documents. It is aimed at replacing the tedious paper works that colleges currently use. The system will collect data and store it for fast and easy reference. The system will provide users with a complete record of their attendance. It is thus helpful in reducing the time and complexity of maintaining the records.

**2.2 PRODUCT FUNCTIONALITY**

The AMS allows the instructor to record, store, and monitor students' attendance history & manage the classroom efficiently. The Product functions are more or less same as described in the product perspective. The functions of the web app includes the system providing different types of services based on the types of users [Administrator/ Instructor/ Student].

* The student should be provided with a login page through which they can login into their respective accounts.
* The student should be provided with the attendance report for different courses over the duration of the same.
* Provisions for the students to raise a query if attendance is wrongly marked and apply for OD.
* The instructors will be able to mark and view attendance of the students who are enrolled in their courses.
* The instructors are provided with the interfaces to approve the raised tickets and OD and alter the marked attendance.
* The administrator can generate login credentials for instructors and students.
* The admin can also change the attendance policies ( minimum attendance mark etc)

**2.3 USERS AND CHARACTERISTICS**

The users of the system are the instructors, students and administrators who maintain the system. The instructors and students are assumed to have basic knowledge of computers and internet browsing. The administrators of the system are assumed to have more knowledge of the internals of the system and are able to rectify the minor problems that may arise due to high traffic, disk crashing and other catastrophes to maintain the system. The proper user interface, user manual, online help and the guide to install and maintain the system must be sufficient on how to guide the users on how to use the web application without any problems.

**2.4 OPERATING ENVIRONMENT**

The Attendance Management System can run on desktop operating systems such as Windows and Linux. The system uses MySQL as a database server. The other software components include SpringBoot, ReactJS and Figma.

**2.5 DESIGN AND IMPLEMENTATION CONSTRAINTS**

* The attendance management system will be designed to work with the existing infrastructure of the college, including hardware, software, and network. The institution's system must be compatible with the internet applications.
* The system will be scalable to accommodate the growing number of students and instructors.
* The system will also be secure and protect the privacy of student information.The information of all users must be stored in a database that is accessible by the AMS.
* The web application is connected to the institution's server and is running all 24 hours a day.
* The users access the web application from any computer that has internet connection and browsing capabilities.
* The users must have their correct usernames and passwords to enter into their corresponding accounts.

**2.6 USER DOCUMENTATION**

The system comes with a very easy user interface. It provides a printed user manual in pdf format. It also includes a forum where users can discuss and clarify their doubts regarding the issues faced by them while using the application.

**2.7 ASSUMPTIONS AND DEPENDENCIES**

* The users have sufficient knowledge of computers.
* The users have basic english knowledge, as the interface will be provided in English.
* The college's network infrastructure is sufficient to support the attendance management system with required network bandwidth, server capacity, and network security.
* The institution’s server loads all the end users accessing the web application at the same time.
* The product can access the institution’s student database.
* Assuming that all the information entered by the user will be correct. If any wrong information is found then the system will notify an alert.
* The system is required to save generated reports.
* The system is dependent on compliance with all applicable regulations and policies.

**3. SPECIFIC REQUIREMENTS**

**3.1 External Interface Requirements**

**3.1.1 User Interfaces**

The User Interface Screens are described in table 1.

**Table 1: Attendance Management User Interface Screens**

| **Screen Name** | **Description** |
| --- | --- |
| Register | Create user ID (Student and Professor individually) |
| Login | Log into the system. |
| Professor | Mark attendance, approve/reject OD request, approve/reject ticket for attendance claim. |
| Student | Display attendance, raise ticket claiming attendance. |
| Leave records | Display to leave history. |
| Apply for OD | Application for OD with relevant documents as proof. |
| Approve/reject OD | If the Professor approves the OD request, records get updated automatically. If the professor rejects it, the records remain unchanged. |

**3.1.2 Hardware Interfaces**

The system shall run on :

Operating system: Any OS.

Scripts which support CGI, HTML & Javascript.

Web Browser : Google Chrome , Mozilla firefox.

**3.1.3 Software Interfaces**

The system shall interface with MySql database.

To implement the project we have chosen React for frontend , Spring Boot for backend and Figma for UI for easy interaction.

**3.2 Functional Requirements**

* User Management: The system should allow the admin to create and manage user accounts for faculty, students, and staff. The admin should be able to assign roles and permissions to each user.
* Attendance Recording: The system should allow faculty to mark attendance for each student in their class. The faculty should be able to mark attendance by marking present/absent.
* Attendance Reporting: The system should allow faculty or admin to generate attendance reports for each student or the entire class. The reports should show the total number of classes held, the total number of classes attended, and the percentage of attendance for each student.
* Notifications: The system should send notifications to faculty and students regarding attendance, leaves and warning if attendance goes below 75%.
* Analytics and Insights: The system should provide analytics and insights on attendance patterns, such as the percentage of attendance for each course, the percentage of students with high or low attendance, and other relevant metrics.
* Integration with Other Systems: The system should be able to integrate with other systems like student information systems and learning management systems to provide a seamless experience for faculty and students.
* OD Application:The system should allow students to apply for OD with necessary documents and get approval from faculty. Faculty should be able to view the application and verify documents.

**4. NON-FUNCTIONAL REQUIREMENTS**

Non-functional requirements define the needs in terms of performance, logical database requirements, design constraints, standards compliance, reliability, availability, security, maintainability, and portability.

**4.1 PERFORMANCE REQUIREMENTS**

Performance requirements define acceptable response times for system functionality.

* Accuracy: The system should accurately record attendance data to ensure that the attendance records of students are reliable and trustworthy.
* Timeliness: The system should be able to capture attendance data in real-time or as close to real-time as possible to enable faculty and staff to make informed decisions based on the most up-to-date information.
* Scalability: The system should be able to handle a large volume of data and users, as colleges can have many students, faculty members, and staff who will use the system concurrently.
* Accessibility: The system should be accessible to all users, including those with disabilities or who may need special accommodations to access the system.
* Security: The system should be secure and protect the privacy of student data, preventing unauthorized access to attendance records.
* User-friendliness: The system should be easy to use and intuitive, allowing faculty, staff, and students to quickly navigate and use the system without extensive training or support.
* Integration: The system should integrate with other systems used by the college, such as the student information system, to streamline the attendance tracking process.
* Reporting: The system should generate reports that are useful for faculty, staff, and administrators to monitor attendance trends and identify areas for improvement.

**4.2 SECURITY REQUIREMENTS**

* Access Control: The system will have proper access controls, including password protection and user role-based permissions, to ensure that only authorized personnel can access attendance data.
* Data Encryption: Attendance data will be encrypted when in transit and at rest to protect it from unauthorized access.
* Data Backup and Recovery: The system will have a backup and recovery mechanism to prevent the loss of data in case of system failure, disaster, or cyber-attacks.
* Audit Trails: The system will maintain audit trails to track any modifications to attendance data to detect and prevent any fraudulent activities.
* User Authentication: The system will have a robust user authentication mechanism to ensure that users are who they claim to be.
* System Monitoring: The system will have a continuous monitoring mechanism to detect and prevent any unauthorized access attempts, suspicious activities, or security breaches.
* System Updates and Patches: The system will be updated regularly with the latest security patches to prevent any vulnerabilities that may be exploited by attackers.

**4.3 SOFTWARE QUALITY ATTRIBUTES**

**4.3.1 Standards Compliance**

* Security: The system will be designed and developed in a way that protects user data from unauthorized access or breaches.
* Privacy: The system will be designed and developed in a way that collects and processes personal data in a transparent and lawful manner.
* Usability: The system will be designed and developed in a way that makes it easy for users to use and understand.
* Reliability: The system will be designed and developed in a way that ensures it performs consistently and without errors.
* Performance: The system will be designed and developed in a way that ensures it can handle the expected number of users and transactions.
* Maintainability: The system will be designed and developed in a way that makes it easy for developers to maintain and update it.

**4.3.2 Reliability**

* Accuracy: The system will accurately record and track attendance for each student, ensuring that the data is reliable and can be used for attendance reporting and analysis.
* Availability: The system will be available and accessible to users whenever they need to use it, without any downtime or service disruptions that could impact attendance tracking.
* Recovery: In the event of a system failure or other issue, the system will be able to recover quickly and without data loss, ensuring that attendance data is preserved and can be used for reporting and analysis.
* Consistency: The system will provide consistent and reliable results over time, regardless of changes in workload or usage patterns.
* Scalability: The system will be able to handle an increasing number of users and data volumes without compromising its reliability or performance.

**4.3.3 Availability**

The system will be constantly monitored for issues that could impact availability, such as system performance or server availability. This can help ensure that any issues are detected and resolved quickly, minimizing the impact on users.The system will have a disaster recovery plan in place to ensure that critical data can be recovered in the event of a system failure or outage. This should include regular backups of system data and the ability to restore that data quickly and efficiently.

**4.3.4 Maintainability**

Maintainability is one of the important software quality attributes that refers to the ease with which software can be modified, enhanced, or adapted.

* Modularity: The system will be designed in a modular way so that it is easy to modify, enhance or replace a particular module without affecting the other modules. This will make it easier to maintain the system in the long run.
* Code readability: The code will be well-organized, well-documented, and easy to understand. This will make it easier for developers to maintain and modify the code when required.
* Flexibility: The system will be flexible enough to accommodate changes and updates as per the evolving requirements of the college. It should be easy to add new features, modify existing ones, and integrate with other systems.
* Testability: The system will be designed in a way that it can be easily tested for errors and bugs. This will make it easier to locate and fix any issues in the system, and ensure that the system continues to function smoothly.
* Scalability: The system will be scalable to accommodate changes in the size of the college, such as an increase in the number of students or courses. This will ensure that the system can continue to handle the growing needs of the college.
* Maintainability tools: The system will be developed using tools that support maintainability, such as version control systems, automated testing tools, and code analysis tools. These tools can help developers to identify and fix issues quickly, and ensure that the system is well-maintained.

**4.3.5 Portability**

The Attendance Management System shall run in any web browser that contains Java Runtime and the MySQL Access Database.