SOFTWARE REQUIREMENTS SPECIFICATION

**For**

**Student Attendance System**

**Prepared by:-**

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# Introduction

## Purpose

## The aim of this project is to introduce an easy-to-use and effective system to facilitate attendance monitoring at educational institutions. Our solution streamlines the process for instructors, courses, and students in response to the growing need for efficient attendance management. Using a user-centric design, the system seeks to give faculty members and administrators the necessary resources for easy-to-use analytics, reporting, and attendance tracking. The goal of our project is to improve overall efficiency and make a positive impact on the educational management experience by emphasizing simplicity and functionality.

## Document Conventions

* + - Entire document should be justified.
    - Convention for Main title

Font face: Times New Roman Font style: Bold

Font Size: 14

* + - Convention for Sub title

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Font Size: 12

* + - Convention for body

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## Scope of Development Project

This development project's scope includes the all-encompassing improvement of attendance tracking in educational settings. We also work on developing an integrated system that makes tracking attendance for students, teachers, and courses easy. Implementing user-friendly interfaces for effective data input and retrieval, having tools for reporting and analytics that are customizable, and building a secure data management framework are essential components. With a scalable system that can be adjusted to meet changing institutional requirements, the project seeks to meet the various needs of administrators and faculty members. This development project will help promote an efficient and cutting-edge method of managing attendance in educational settings.

The project can be easily implemented under various situations. We can add new features as and when we require, making reusability possible as there is flexibility in all the modules.

The language used for developing the project is Java as it is quite advantageous than other languages in terms of performance, tools available, cross platform compatibility, libraries, cost (freely available), and development process.

## Definitions, Acronyms and Abbreviations

JAVA -> platform independence SQL-> Structured query Language ER-> Entity Relationship

UML -> Unified Modeling Language

IDE-> Integrated Development Environment SRS-> Software Requirement Specification

## References

* + - Books
    - Education Tech Insights, for instance, (2021). transforming systems for managing attendance.
    - Smith, K. (2019). Technology's Place in Educational Administration.
    - Websites

<https://www.edtechworld.com/role-of-technology>

<https://www.educationtechinsights.com/>

# Overall Descriptions

## Product Perspective

Use Case Diagram of Student Attendance System

The use case diagram for the student attendance system shows a high-level overview with different user

roles, such as staff and students. Through the system's search feature, users may look through attendance

resources. There are other parameters that may be used to do the search, including the student's name or

identification number. System administrators may also manage user profiles and add/update attendance data.

Subject to certain requirements, users—including staff and students—can begin requests for attendance issues,

renewals, or returns. With an emphasis on the fundamental user actions and system capabilities, this figure

summarizes the main interactions and features inside the Student Attendance System

## Product Function

Entity Relationship Diagram of Student Attendance System



The Student Attendance System offers real-time online information regarding attendance records and user details, aiming to streamline and reduce manual workload. The primary objective is to automate the management of attendance issues, returns, fine calculation, and report generation based on user preferences. The administrator, in this case, a designated faculty member, holds control over students and attendance management. The system maintains the status of attendance issue/return in the database, accessible by the administrator for timely retrieval. Valid users, students in this context, have the privilege to view their attendance information, contributing to an efficient and user-friendly attendance management process.

## User Classes and Characteristics

An attendance management system is a software that records students’ attendance and provides insight into the overall attendance ratio in a class. It informs teachers about what the attendance trends look like in their classroom and the number of students unable to meet the required attendance percentage.

The benefits of using a student attendance management system are:

1. **User-friendly**: The attendance management system is designed to help teachers record student attendance hassle-free. The interface is designed in a simple format to provide ease to every teacher. [Moreover, the system also provides fast and secure data recovery](https://blog.teachmint.com/attendance-management-system-benefits-characteristics/).
2. **Quick report generation**: With the help of a student attendance management system, teachers can generate detailed class attendance reports. These reports can be downloaded and stored for compliance purposes. Likewise, the reports also provide information on various aspects like student-wise, class-wise, and month-wise attendance. [Moreover, teachers can download current and back-dated reports](https://blog.teachmint.com/attendance-management-system-benefits-characteristics/).
3. **Zero Errors:**[When the attendance process is automated, there is a low chance of errors when recording attendance](https://blog.teachmint.com/attendance-management-system-benefits-characteristics/).

## Operating Environment

## The operating environment for a student attendance management system is an important aspect to consider. [I found a document that provides a software requirements specification for an attendance management system](https://www.studocu.com/in/document/rajiv-gandhi-proudyogiki-vishwavidyalaya/computer-science/idoc-srs-for-attendance-management-system/27627313).

* 1. **Assumptions and Dependencies**
* **OE-1**: The Attendance Management System shall function on the PC provided by the college. This entails the system to operate on the Windows CE platform.
* **OE-2**: The Attendance Management System shall interface between Windows CE designated to store the attendance records. The Web Server and Database Software have not been established at this point.
* **OE-3**: The Attendance Management System will record all the essentials details of each particular student.
* **OE-4**: Pentium 3 GHz or higher RAM must be 1 Gb or more and Hard Drive 10 GB or more.

## Requirement

Software Configuration:-

Java is used as the front-end programming language for the Student Attendance System, with help from

Sun Microsystems. JavaFX or Swing are used to create the graphical user interface (GUI) in the

NetBeans 7.0.1 integrated development environment (IDE). Microsoft SQL Server is used as the back

end database system, while JDBC (Java Database Connectivity) provides connectivity for effective data

management. Windows NT, Windows 98, Windows XP, and Windows 10 are among the Windows

operating systems with which the software is intended to work.

Hardware Configuration:-

Processor: Pentium(R)Dual-core CPU Hard Disk: 40GB

RAM: 256 MB or more

## Data Requirement

Teachers enter dates, student IDs, and class IDs into the student attendance system to record attendance.

Updates include modifications to student records, such as withdrawals or new enrollments. The system

creates through attendance logs and, upon request, gives particular student information. It manages low

attendance notices and marking results. This method incorporates scalability for increased activity, audit

trail, educational system integration, security, and privacy.

# External Interface Requirement

The Student Attendance System's graphical user interface (GUI) is made to be easy to use for both

administrators and students. Its simple, user-friendly design makes it simple to navigate about the

system. Administrators can evaluate overall attendance patterns and identify students with low attendance

within a specific time frame by using the important attendance data that are provided in a dedicated

section for rapid reports. Administrators can easily find particular attendance data by using the extensive

search feature built into the UI. One important feature is customization, which gives administrators the

power to change the interface's color scheme or theme to suit their tastes. All system parts are seamlessly

integrated into the graphical user interface thanks to the modular design, which also maintains consistency

through a standard System Features.

**4.System features**

The users of the system should be provided the surety that their account and the data’s are secured.

the security of user accounts in the Student Attendance System, unique student IDs are employed for user

authentication, supported by robust validation mechanisms during login. Administrator monitoring is a

key feature, with routine updates of account statuses, popup notifications for book issuance limit

breaches, and the ability to assign fines for attendance date lapses. The system strictly enforces

accountability, restricting members from accessing or managing other accounts, and granting exclusive

authority over all member accounts to the administrator. These measures collectively reinforce the system's

commitment to user privacy and data security.

# 5.Other Non-functional Requirements

## 5.1Performance Requirement

## The Student Attendance System, designed to serve as the primary performance system across various university campuses, is anticipated to seamlessly interact with university staff and students. It is imperative that the system fulfills all specified university requirements efficiently.

* + - Fast and accurate system performance for managing student attendance records.
    - Robust error handling mechanisms to address both expected and unexpected errors promptly.
    - Proactive error testing to identify and prevent invalid username/password entries, ensuring information integrity and minimizing downtime.
    - Efficient handling of a large amount of data, accommodating a high number of students and staff without compromising system performance or functionality.

## 5.2 Safety Requirement

The Student Attendance System must comply with strict access restrictions and authentication

protocols to preserve user privacy, a reliable backup system for data protection, and user confidentiality

safeguards. The system enhances operational integrity and security by utilizing thorough logging and

efficient error handling to identify problems quickly. Together, these precautions guarantee data integrity

and privacy while constructing a dependable and safe student attendance system.

## 5.3 Security Requirement

* + - The system will utilize a secured database infrastructure to safeguard attendance data.
    - Regular users will have read-only access, restricted from editing or modifying any data except their personal information and designated fields.
    - Different user types will have distinct access constraints, ensuring proper control over system functionalities.
    - Robust user authentication mechanisms will be implemented to verify the identity of users securely.
    - Stringent measures will be in place to prevent password hacking, ensuring the confidentiality of user credentials.
    - Separate accounts will be established for administrators and members, with only administrators having the rights to update the attendance database, maintaining strict access control.

## 5.4 Requirement attributes

* + - The ability to modify the system will be shared by several administrators, allowing for cooperative project management. Editing rights will not be granted to regular users or members in order to preserve regulated access.
    - The open-source nature of the student attendance system's development will encourage cooperation and openness.
    - User-friendliness will be given top priority in the database quality, guaranteeing that all system users may interact with attendance records in an understandable manner.
    - Easy download and installation procedures will be prioritized in the system's design to enhance accessibility and usefulness for a wide range of users.

## 5.5 Business Rules

The Student Attendance System's business rules set forth standards for user conduct, judgment, and

data inference. They address the pricing structure of the project, any discounts that may be available,

and the legal requirements that administrators and members must meet. The purpose of these regulations

is to guarantee the efficacy and integrity of the student attendance system.

## 5.6 User Requirement

The users of the Student Attendance System consist of university members and administrators, including librarians who serve as system administrators. Members are assumed to possess basic computer and internet browsing knowledge, while administrators are expected to have deeper insights into system internals to address potential issues like disk crashes or power failures. The system should provide a user-friendly interface, comprehensive user manual, online help, and installation guides to ensure seamless user understanding and operation.

Administrators offer essential facilities to users, including:

* + - Backup and Recovery: Ensuring data safety and retrieval capabilities.
    - Forgot Password: A feature for users to reset forgotten passwords.
    - Data Migration: Storing user data on the server upon initial registration.
    - Data Replication: Safeguarding against data loss by maintaining copies on the server.
    - Auto Recovery: Frequent auto-saving of information to prevent loss.
    - Maintaining Files: Organizing and managing files efficiently.
    - Regular Server Maintenance: The server must undergo regular maintenance.

# 6.Other Requirements

## 6.1Data and Category Requirement

## The Student Attendance System has the following user groups: students, teachers, administrators, and librarians. Users' categories determine their access privileges. Administrators can add, edit, and remove data, while all other users—aside from librarians—can only get data from the database.

## Similar to this, attendance records will be divided into several groups, and pertinent information will be shown according to these categories. To achieve uniformity and clarity in the system, the classification and related data should follow a consistent structure. According to their individual roles and responsibilities within the student attendance system, this organized method guarantees that users may deal with attendance data efficiently.

## 6.2 Appendix

A: Admin, Abbreviation, Acronym, Assumptions; B: Attendance, Business rules; C: Class, Client,

Conventions; D: Data requirement, Dependencies; G: GUI; K: Key; L: Library, Librarian; M: Member;

N: Non-functional Requirement; O: Operating environment; P: Performance, Perspective, Purpose; R:

Requirement, Requirement attributes; S: Safety, Scope, Security, System features; U: User, User class

and characteristics, User requirement;

## 6.3 Glossary

The following are the list of conventions and acronyms used in this document and the project as well:

* + - Administrator: A login ID representing a user with user administration privileges to the student attendance software.
    - User: A general login ID assigned to most users.
    - Client: Intended users for the student attendance software.
    - SQL: Structured Query Language; used to retrieve information from a database.
    - SQL Server: A server used to store data in an organized format.
    - Layer: Represents a section of the student attendance system.
    - User Interface Layer: The section referring to what the user interacts with directly.
    - Application Logic Layer: The section referring to the Web Server, where all computations are completed.
    - Data Storage Layer: The section referring to where all student attendance data is recorded.
    - Use Case: A broad-level diagram showing a basic overview of the student attendance system.
    - Class Diagram: A static structure diagram describing the structure of the student attendance system by showing cases, attributes, and relationships between classes.
    - Interface: Something used to communicate across different mediums.
    - Unique Key: Used to differentiate entries in the student attendance database.

**6.4 Class Diagram**

in the Student Attendance System, a class is a user-defined, abstract representation of a certain

kind of data. It outlines the characteristics of the data as well as the actions that may be taken on

instances or other data objects. Every class has a name, a collection of attributes that define its

properties, and a set of actions that are relevant to the class's objects.

The arrangement of classes and their connections serve as a representation of the system's static

model. This project includes the primary classes that are related to other classes that are necessary

for them to function. The figure shows several kinds of links between classes, including

aggregation, generalization, and normal association. Role names and multiplicities are used to

identify relationships.

In this particular situation, important classifications.

which are related to other classes required for their working. There are different kinds of relationships between the classes as shown in the diagram like normal association, aggregation, and generalization. The relationships are depicted using a role name and multiplicities. Here ‘Librarian’, ‘Member’ and ‘Books’ are the most important classes which are related to other classes.

