Software Requirements Specification

for

Employee Management System

Version:1.0

Prepared by

Group Name:

K.Lithin	Se22ucse130	se22ucse130@mahindrauniversity.edu.in
G.vamshi	Se22ucse102	se22ucse102@mahindrauniversity.edu.in
E.Sai Aashrith	Se22ucse090	se22ucse090@mahindrauniversity.edu.in
K.Devi sree	Se22ucse080	se22ucse080@mahindrauniversity.edu.in
N.chakrika	Se22ucse064	se22ucse064@mahindrauniversity.edu.in
M.Meghana	Se22ucse167	se22ucse167@mahindrauniversity.edu.in

P.Aashritha	**Se22ucse215**	**se22ucse217@mahindrauniversity.edu.in**

Instructor:	***DR.Vijay Rao Duddu***
Course:	**Software Engineering**
Lab Section:	***C***
Teaching Assistant:	***Mrs.Nartakani***
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Contents

Revisions

Version	Primary Author(s)	Description of Version	Date Completed
1.0	K.Lithin G.vamshi E.Sai Aashrith k.Devisree N.Chakrika M.Meghana P.Aashritha	The first version of the Employee Management System (EMS) is designed to streamline employee data management, including personal information, attendance, payroll, and performance tracking. It allows HR personnel to efficiently add, update, and monitor employee records while generating reports for better decision-making and improved operational efficiency.	10/03/2025

1. Introduction

Introduction to the Project:

This project focuses on the development of an Employee Management System (EMS) designed to optimize and automate various HR processes. The system aims to enhance the management of employee data, including personal details, attendance, payroll, and performance evaluations, ensuring a seamless and efficient workflow for HR professionals.

Overview of This Section:

In this section, you will find a comprehensive description of the system's objectives, scope, and features. It includes an outline of the problem the EMS addresses, the technological stack used for development, and an overview of how the system functions to meet the needs of both employees and HR staff.

1.1 Document Purpose :

The purpose of this document is to provide a detailed specification of the Employee Management System (EMS), outlining its requirements, functionality, and design. It serves as a reference for stakeholders, developers, and project managers throughout the development and implementation phases. This document ensures clarity in the system's objectives, design decisions, and the expected outcomes, enabling effective communication and alignment across all parties involved.

1.2 Product Scope:

The Employee Management System (EMS) is a comprehensive software solution designed to streamline HR processes by automating employee data management. The system will allow HR teams to efficiently manage employee records, track attendance, handle payroll, monitor performance, and generate reports. By centralizing these operations into a single platform, EMS will significantly reduce administrative overhead, minimize human error, and improve data accuracy.

The key benefits of the EMS include increased operational efficiency, improved data accessibility, and enhanced decision-making through real-time reporting and analytics. The system aims to reduce manual tasks and improve the overall employee experience by providing a transparent and organized approach to managing personnel-related tasks. Ultimately, the goal is to create a user-friendly and scalable system that supports HR departments in maintaining a productive and well-managed workforce.

1.3 Intended Audience and Document Overview:

This Software Requirements Specification (SRS) document is intended for a variety of readers involved in the development, implementation, and evaluation of the Employee Management System (EMS). The primary audience includes:

- Project Managers:To understand the scope, objectives, and timeline for the EMS project.
- Developers:To gain detailed insights into the system's technical requirements, design, and functional specifications.
- Testers: To identify the key areas for quality assurance, ensuring that the system meets the specified requirements.

- Client (Professor):To review the overall functionality, benefits, and intended use of the EMS, ensuring it aligns with the project's goals and expectations.
-Documentation Writers: To assist in creating user manuals and other documentation necessary for the final product.

The document is organized to first provide a high-level overview of the EMS in the Introduction and Product Scope sections, offering a general understanding of the system's goals, benefits, and objectives. Following this, the System Features and Functional Requirements provide detailed descriptions of the core functionalities. Non-Functional Requirements and System Architecture offer insights into performance, scalability, and design considerations.

For readers such as developers and testers, the System Features and Functional Requirements are the most relevant sections, while System Architecture will be important for developers and project managers to understand the system's technical framework. Clients and professors can begin with the Introduction and Product Scope, progressing to System Features to get a detailed picture of the system's operation and how it meets user needs.

1.4 Definitions, Acronyms and Abbreviations:

Below is a list of all abbreviations and acronyms used in this document, sorted in alphabetical order:

- EMS – Employee Management System: A software solution designed to streamline HR processes, including employee record management, attendance tracking, payroll processing, and performance evaluation.
- HR– Human Resources: The department responsible for managing employee relations, including hiring, training, payroll, and benefits.
- SRS– Software Requirements Specification: A document that describes the functional and non-functional requirements of a software system, along with its design and other specifications.
- UI– User Interface: The part of the software system that interacts with the user, including screens, buttons, and menus.
- UX – User Experience: The overall experience a user has when interacting with a system, including usability, efficiency, and satisfaction.
- SQL – Structured Query Language: A programming language used for managing and querying relational databases.
- API – Application Programming Interface: A set of protocols and tools that allow different software applications to communicate with each other.
- DBMS – Database Management System: Software that manages and organizes data in a database, providing functionalities like data storage, retrieval, and security.

This list includes the key terms specific to the Employee Management System (EMS) that will be referred to throughout this document

1.5 Document Convention:

This Software Requirements Specification (SRS) document follows established formatting standards to ensure clarity and consistency. Below are the typographical and formatting conventions used throughout the document.

Formatting Conventions
- Font: The document uses Arial font, size 11 or 12, for all text. This ensures legibility and consistency throughout.
- Text Spacing: The text is single-spaced with 1" margins on all sides, as per the IEEE formatting guidelines.

- Headings and Subheadings: Section titles (e.g., 1.0, 1.1, etc.) are formatted according to the IEEE template. Major sections use bold, size 14 font, while subsections use bold, size 12 font for clear differentiation.
- Paragraphs: All paragraphs are aligned to the left without indentation, with an additional space between paragraphs for readability.
- Italics:Italics are used to highlight comments, notes, or placeholders that are meant to be replaced or referenced for clarity.

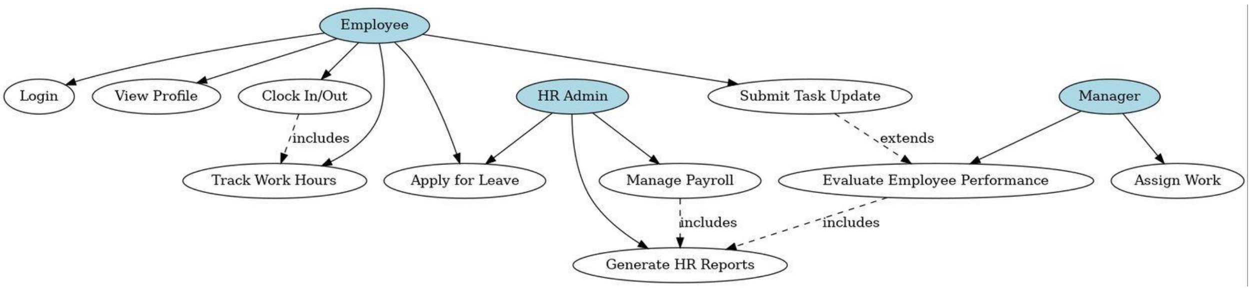
Naming Conventions
- Section Titles: Section and subsection titles are written in capitalized words to make them stand out. The titles adhere to the numbering system outlined by the IEEE standard (e.g., 1.0, 1.1, 1.2).
- Variables and System Components:Any reference to system components, variables, or specific features (e.g., “Employee Records,” “Payroll System”) are capitalized consistently throughout the document.
- Code and SQL Queries: When presenting code snippets or SQL queries, they are written in a monospaced font to distinguish them from regular text and enhance readability.

Abbreviations and Acronyms
- Abbreviations and acronyms are defined the first time they are introduced in the document, and the full form is used at that time. Subsequent mentions may use the acronym for ease of reading (e.g., "Employee Management System (EMS)" is used initially, followed by EMS thereafter).

These conventions help ensure that the document is easily readable, consistent, and aligned with industry standards for technical specifications.

1.6 References and Acknowledgments

The below diagram is use case diagram(UML) of this project:



2. Overall Description

2.1. Product Overview:

The Employee Management System (EMS) is a self-contained product designed to streamline HR processes such as employee record management, attendance tracking, payroll, and performance evaluation. It is not a replacement for existing systems but a new solution targeting small to medium-sized enterprises. The EMS integrates with external systems, such as accounting and communication tools, via APIs, enhancing its flexibility and scalability. The system features a centralized database for storing employee data and offers a user interface for HR staff, administrators, and employees. EMS automates key tasks, improves efficiency, and supports better decision-making in HR management.

2.2 Product Functionality

1. Employee Information Management
2. Attendance Management
3. Payroll and Compensation Management
4. Performance Management
5. Recruitment and Onboarding
6. Training and Development
7. Leave and Holiday Management
8. Employee Self-Service Portal
9. Reporting and Analytics
10. Security and Data Protection
11. Communication and Notifications
12. Compliance Management

2.3 Design and Implementation Constraints

The System will be developed using the MERN stack.

The UI must be responsive across mobile and desktop device.
Payment processing will be integrated with Gpay,Phonepay,PayPal.

2.4 Assumptions and Dependencies
Users require an active internet connection.

Third-party APIs (e.g., GPay, Phone Pe, Paytm,) are used for payments and notifications.

Events are categorized to improve discoverability.

3. Specific Requirements

3.1. External Interface Requirements

3.1.1. User Interfaces

Logical Characteristics of Thermostat User Interface:

1. Touchscreen Interface : Users will interact with a responsive touchscreen.
2. Temperature Control : Use up/down arrows or a slider to set desired temperature.
3. Mode Selection : Buttons for heating, cooling, and off modes.
4. Menu Navigation : Simple on-screen menu for settings and preferences.
5. Feedback : Visual indicators show current temperature and system status.

(Graphic will be provided based on project description.)

3.1.2. Hardware Interfaces

Hardware Interfaces for Employee Management System:

1. Database Server : Stores employee data, accessed by software for CRUD operations.
2. Attendance Devices : Interfaces with biometric or RFID systems to log attendance data.
3. Payroll System : Connects with payroll systems for salary processing.
4. Communication Tools : Integrates with email servers for notifications and alerts.

3.1.3. Software Interfaces

Connections Between Employee Management System and Mobile App:

1. Authentication : The mobile app connects to the EMS through a secure login system, allowing user authentication and access control.
2. Data Synchronization : The app syncs employee data (attendance, leave requests) with the EMS database in real-time.
3. Command Sending : The mobile app sends commands (e.g., leave requests, timesheet updates) to the EMS backend for processing.
4. Push Notifications : The app receives push notifications from EMS for important updates (leave approval, payroll updates).
5. User Interface : The mobile app displays EMS data (attendance, performance) in a user-friendly interface, allowing employees and managers to interact with the system remotely.

3.2. Functional Requirements

Functional Requirements for Employee Management System

1. Employee Information Management
   - Add/Update/Delete Employee: HR can manage employee details (add, update, delete).
   - View Employee Profiles: Accessible by authorized personnel.

2. Attendance Management
   - Clock-in/Clock-out: Employees log work hours via manual input or biometric systems.
   - Leave Management: Employees request leave; managers approve/reject.
   - Attendance Reports: Generate daily, weekly, or monthly attendance summaries.

3. Payroll Management
   - Salary Calculation: Automatically calculates pay based on attendance, overtime, and deductions.
   - Payslips: Generate and provide downloadable payslips.
   - Payroll Reports: Generate payroll summary reports.

4. Leave and Holiday Management
   - Leave Requests: Employees submit leave requests for approval.
   - Leave Balances: Track and display available leave days.
   - Holiday Calendar: Display company holiday schedule.

5. Performance Management
   - Goal Setting: Employees and managers set performance goals.
   - Performance Reviews: Periodic feedback and evaluation.
   - KPI Tracking: Track and analyze key performance indicators.

6. Recruitment and Onboarding
   - Job Postings: HR posts job vacancies.
   - Candidate Management: Track and manage applicants.
   - Onboarding: Guide new hires through the onboarding process.

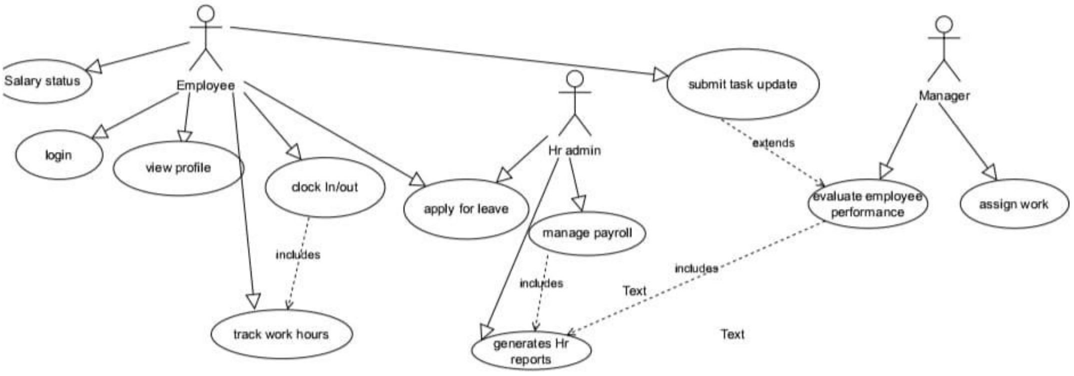
7. Training and Development
   - Training Scheduling: Schedule and assign training programs.
   - Track Progress: Monitor training completion and performance.
   - Certification Management: Issue and track certificates.

8. Employee Self-Service Portal
   - Profile Management: Employees update personal details.
   - Leave Requests: Employees request and track leave status.
   - Payslips Access: Employees access and download payslips.

9. Reporting and Analytics
   - Attendance Reports: Generate attendance summaries.
   - Payroll Reports: Generate payroll distribution reports.
   - Performance Analytics: Analyze employee performance data.

10. Security and Access Control
   - Role-based Access: Ensure access control based on user roles.
   - Data Encryption: Encrypt sensitive employee data.
   - Audit Logs: Maintain logs of user activities for security.

3.3. Use Case Model



3.3.1. Use Case #1 (use case name and unique identifier – e.g. U1)

TO DO: Provide a specification for each use case diagram

Author – Identify team member who wrote this use case

Purpose - What is the basic objective of the use-case. What is it trying to achieve?

Requirements Traceability – Identify all requirements traced to this use case

Priority - What is the priority. Low, Medium, High. Importance of this use case being completed and functioning properly when system is depolyed

Preconditions - Any condition that must be satisfied before the use case begins

Post conditions - The conditions that will be satisfied after the use case successfully completes

Actors – Actors (human, system, devices, etc.) that trigger the use case to execute or provide input to the use case

Extends – If this is an extension use case, identify which use case(s) it extends

Flow of Events

1. Basic Flow - flow of events normally executed in the use-case
2. Alternative Flow - a secondary flow of events due to infrequent conditions
3. Exceptions - Exceptions that may happen during the execution of the use case

Includes (other use case IDs)

Notes/Issues - Any relevant notes or issues that need to be resolved

3.3.2. Use Case #2

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4. Other Non-functional Requirements

4.1. Performance Requirements

P1. Employee profiles should load within 2 seconds when accessed by HR or managers.
P2. Clock-in/clock-out actions must update attendance records in real-time, with a maximum delay of 5 seconds.
P3. Leave requests should be reviewed and approved/rejected within 30 seconds.
P4. Payroll calculations for all employees should be completed within 2 minutes.
P5. Reports should generate within 10 seconds for basic reports and 30 seconds for complex reports.
P6. User access verification should be completed within 3 seconds.

4.2. Safety and Security Requirements

S1. All employee data must be encrypted during transmission and storage to protect privacy and comply with data protection regulations (e.g., GDPR).
S2. User authentication should be required for accessing sensitive information, with multi-factor authentication (MFA) for admins and HR staff.
S3. Regular security audits must be conducted to ensure the system meets industry standards for data protection and complies with relevant safety certifications (e.g., ISO 27001).

4.3. Software Quality Attributes

4.3.1 Reliability
- Requirement: The system shall ensure 99.9% uptime, allowing no more than 8 hours of downtime per year.
- Rationale: Ensuring system reliability is critical to maintaining continuous operations for HR tasks, payroll, and employee management, especially during work hours.
- Implementation: This will be achieved by deploying a load-balanced infrastructure with failover mechanisms to minimize downtime.

4.3.2 Maintainability
- Requirement: The system shall allow for updates, bug fixes, and feature enhancements to be completed with minimal disruption to users.
- Rationale: Regular updates and maintenance are essential to ensure the system remains secure, functional, and adaptable to changing business requirements.
- Implementation: The software will be modular, with clearly separated components for each function (payroll, attendance, etc.) so that specific areas can be updated without affecting others.

Additionally, code will be well-documented, following industry-standard coding conventions, and covered with unit and integration tests to ease debugging and maintenance.

4.3.3 Usability

- Requirement: The system shall provide an intuitive user interface with a user satisfaction score of at least 85% based on annual user feedback surveys.
- Rationale: Ease of use is a key factor in employee engagement and HR efficiency, reducing the learning curve and increasing user adoption.
- Implementation: The system will employ a simple and clean interface with consistent layouts, easy navigation, and in-app guidance. User feedback will be collected regularly to iteratively improve the design.

4.3.4 Adaptability

- Requirement: The system shall be adaptable to new hardware devices (biometric scanners, RFID systems) and external software (payroll systems, HR tools).
- Rationale: As the system evolves, it needs to seamlessly integrate with new devices or software to meet evolving business requirements.
- Implementation: The system will use APIs and standardized protocols to ensure easy integration with third-party tools and devices, and be designed to easily accommodate new hardware through configuration, rather than code changes.

4.3.5 Interoperability

- Requirement: The system shall support integration with at least 3 third-party HR or payroll systems, such as ADP or BambooHR.
- Rationale: To maximize operational efficiency, the system must integrate well with external tools to minimize redundancy and ensure smooth data exchange.
- Implementation: The system will implement RESTful APIs for integration with external software. These APIs will be well-documented and follow industry standards to ensure ease of use by external developers.

These quality attributes ensure the system is robust, user-friendly, and flexible enough to handle future changes in the HR landscape.

5. Other Requirements

5. Other Requirements for Employee Management System

5.1 Database Requirements

- Requirement : The system shall use a relational database (e.g., MySQL, PostgreSQL) for storing employee data, payroll records, and attendance logs.
- Rationale : A relational database is ideal for managing structured data with relationships between entities (e.g., employees, departments, payroll).
- Implementation : The database schema will be normalized to minimize redundancy and ensure data integrity. Additionally, proper indexing will be implemented for fast data retrieval, especially for reports and queries.

5.2 Internationalization Requirements

- Requirement : The system shall support localization for multiple languages, including English, Spanish, and French.
- Rationale : As the organization expands globally, the system should accommodate users in different regions and languages.
- Implementation : The system will be designed with internationalization in mind, utilizing a translation management system and ensuring all text strings are externalized for easy translation.

5.3 Legal Requirements
- Requirement : The system shall comply with data protection laws such as the General Data Protection Regulation (GDPR) in the EU and the California Consumer Privacy Act (CCPA) in the U.S.
- Rationale : Compliance with legal requirements ensures that the system adheres to privacy laws and protects employee data.
- Implementation : Data collection, storage, and processing procedures will be designed to meet these regulations. Users will have the right to access, modify, or delete their personal data, and all sensitive data will be encrypted and handled securely.

5.4 Reuse Objectives
- Requirement : The system shall maximize code reuse to improve development efficiency and reduce maintenance costs.
- Rationale : Reusing components and code promotes consistency, reduces duplication, and accelerates development.
- Implementation : Common features (e.g., user authentication, reporting modules) will be designed as reusable components. The system will be modular, allowing for easy integration of new features without major changes to existing functionality.

5.5 Scalability Requirements
- Requirement : The system shall be scalable to support up to 10,000 concurrent users.
- Rationale : As the organization grows, the system should be capable of handling an increasing number of users without significant performance degradation.
- Implementation : The system architecture will be designed to scale horizontally, with cloud-based infrastructure supporting auto-scaling and load balancing as needed.

5.6 Backup and Disaster Recovery
- Requirement : The system shall have automated daily backups of all critical data and provide disaster recovery procedures to restore data in the event of failure.
- Rationale : Data loss can severely impact business operations; proper backup and recovery mechanisms ensure business continuity.
- Implementation : Backups will be encrypted and stored offsite, with recovery procedures tested quarterly to ensure quick restoration in case of system failure.

These additional requirements ensure that the system operates efficiently, complies with regulations, and can scale with the organization’s future needs.

Appendix A – Data Dictionary

1. Employee_ID: Unique identifier for each employee.
2. First_Name: Employee's first name.
3. Last_Name: Employee's last name.
4. Date_Of_Birth: Employee’s birth date.
5. Department : Department the employee belongs to.
6. Role : Job title of the employee.
7. Salary : Employee’s monthly salary.
8. Attendance_Status : Employee's attendance status (Present, Absent, etc.).
9. Leave_Type : Type of leave requested by the employee (Sick, Vacation, etc.).
10. Leave_Status : Approval status of the leave request (Pending, Approved, Rejected).
11. Clock_In_Time : Timestamp when employee clocks in.
12. Clock_Out_Time : Timestamp when employee clocks out.
13. Work_Hours: Total hours worked by the employee in a day.
14. Performance_Rating: Rating given based on performance review (1 to 5).
15. Last_Login_Time: Last time the employee logged into the syste

Appendix B - Group Log:

1. Discussed project scope, roles, and responsibilities. Decided on the employee management system as the project focus.

2. Collected functional and non-functional requirements through client interviews and research.

3. Brainstormed and designed the database schema, including entities like employee, department, salary, and leave.

4. Divided tasks based on team members' expertise—some focused on database design, others on front-end and back-end development.

5. Explored the system architecture, considering scalability and integration with existing systems.

6. Held mid-project check-ins to ensure tasks were on track and resolved any blockers.

7. Iterated on the design document, including user interface layouts and functional requirements.

8. Discussed and planned test cases for system validation, focusing on user interaction, data integrity, and performance.

9. Reviewed security measures and compliance with privacy laws (e.g., GDPR, CCPA) to ensure data protection.

10. Conducted a final review of the document, ensuring all sections were completed, accurate, and aligned with the project's goals.