Title of the project

College Library & Smart Attendance Management System.

Introduction

The **College Library & Smart Attendance Management System** is a full-stack web application designed to automate library operations and monitor student attendance efficiently. The system uses register number-based entry and exit scanning to track the time students spend inside the library, ensuring accurate attendance records without manual intervention.

It provides real-time features such as live seat availability, automatic hour calculation, and student-wise attendance tracking, helping both students and administrators manage library usage effectively. In addition to attendance, the system includes complete library management functionalities such as book search, issue and return management, fine calculation, reservations, and notifications.

Problem Statement

Existing library management system has issues such as:

- No user-friendly interface.
- Students can only see the library hours.
- Does not display the live available seats in the library.
- Students cannot check the availability of the books.
- No reservation of books.
- Does not display the list of books borrowed by individual students.

Objectives of the project

- To automate the library attendance using entry-exit system.
- To display the live seat availability.
- To reserve any book for students.
- To prevent duplicate and proxy attendance.
- To manage issues of books.
- To manage fines, for delaying the return of books.

Scope of the project

- Student entry-exit based on register number.
- Calculating duration automatically.
- Real-time seat availability.
- Student dashboard to view hours, borrowed books, reservation of books, and fine management.
- Admin panel for monitoring and reports.

Functional requirements

- Register student entry and exit time.
- Calculate visit hours.
- Store attendance records securely.
- Display attendance history.
- Update seat availability instantly.

Non-Functional requirements

- Secure authentication.
- Fast response time.
- User-friendly interface.
- Scalable database design.

Module description

1. User & Admin Management Module

- Manages user roles such as students and admin/librarian.
- Students can log in to view their attendance, books, and fines, while the admin controls user data, permissions, and system settings.

2. Entry–Exit Attendance Module

- Records student library attendance using register number.
- Entry time is recorded when a student enters the library, and exit time is updated when the student leaves.
- Duplicate entries are prevented by allowing only one active session per student.

3. Attendance & Hour Calculation Module

- Automatically calculates the time spent in the library for each visit.
- The system stores visit-wise duration and computes total library hours for each student accurately.

4. Student Dashboard Module

- Displays complete information for a single student, including total library hours, daily attendance history, issued books, fines, and notifications in a simple and clear format.

5. Seat Management Module

- Tracks the total seating capacity of the library.
- The system updates occupied and available seats in real time based on student entry and exit scans.

6. Book Management Module

- Allows the admin or librarian to add, update, delete, and manage books.
- Supports multiple copies of books and automatically maintains book availability status.

7. Search & Browse Module

- Enables students to search and browse books by title, author, or category and view real-time availability.

8. Issue & Return Module

- Handles book issue and return operations.

- Updates book stock, student records, and due dates automatically.

9. Fine Management Module

- Calculates fines for late book returns.
- Students can view fines in their dashboard, and admins can manage or clear fine records.

10. Book Reservation Module

- Allows students to reserve unavailable books.
- The system notifies students when the reserved book becomes available.

11. Notification Module

- Sends alerts for due dates, overdue fines, and reserved book availability to keep users informed.

12. Reports & Analytics Module

- Generates reports on student attendance, library usage, seat utilization, and individual student records for monitoring and review.

13. Admin / Librarian Dashboard Module

- Provides a centralized dashboard for admins to monitor attendance, manage books and users, view reports, and control overall library operations.

Hardware and Software requirements

Hardware requirements:

- Computer system.
- Student ID Cards.

Software requirements:

- Frontend: HTML, CSS, and JavaScript.
- Backend: Python (FastAPI).
- Database: PostgreSQL.
- Server: Uvicorn, ASGI server.

Technology stack

- Frontend: HTML, CSS, and JavaScript.
- Backend: Python (FastAPI).
- Database: PostgreSQL.
- Platform: Web Application.

Advantages of the project

- Saves time.
- Accurate hour calculation.
- Reduces manual work.
- Easy monitoring.

Future Enhancements

- Mobile app version.

- Analytics and reports.
- Integration with college ERP.

Conclusion

A web-based College Library & Smart Attendance Management System that automates student library attendance using entry and exit, calculates total time spent, displays real-time seat availability, and efficiently manages books, fines, reservations, and reports through a centralized admin dashboard.