

Project Phase 1 Submission

SMART COLLEGE ACADEMIC PORTAL

A MERN-based centralized academic management system

SUBMITTED BY

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SEMESTER

Semester - 5

DEPARTMENT

Department of Information Technology

INSTITUTION

Government Polytechnic Palanpur

Submission Date: February 17, 2026

Problem Statement & Objectives

▲ THE PROBLEM

- ✖ **Scattered Information:** Academic data is fragmented across notice boards, PDF files, emails, and chat groups.
- ✖ **Missed Deadlines:** Students often miss critical assignment deadlines and important updates due to communication gaps.
- ✖ **Lack of Centralization:** No single unified portal exists for accessing semester-wise and branch-wise subject details.
- ✖ **Inconsistent Access:** Difficulty in managing role-based visibility for Admins, HODs, Teachers, and Students.



◎ OUR OBJECTIVES

- ✓ **Centralized Hub:** Consolidate all academic data into one accessible web portal for all stakeholders.
- ✓ **Smart Subject Management:** Provide detailed subject views with marks distribution, exam types, and syllabus.
- ✓ **Task & Notice System:** Enable digital assignment submission with tracking and targeted notice delivery.
- ✓ **Comprehensive Tracking:** Monitor attendance, manage timetables, and provide real-time student performance views.

System Overview & Architecture

FRONTEND
React +
Tailwind

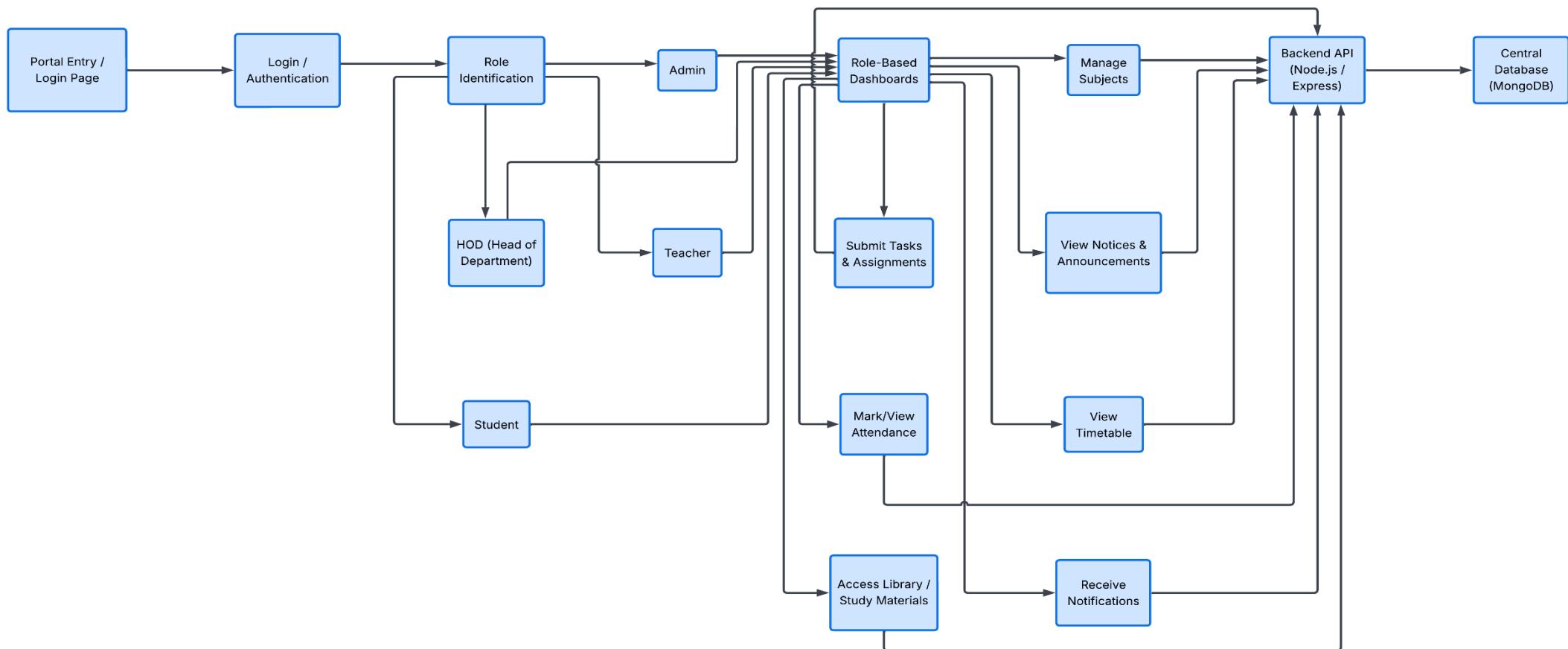
BACKEND API
Node.js +
Express

DATABASE
MongoDB
(NoSQL)

SECURITY
JWT
Authentication

USERS
Admin
HOD
Teacher
Student

1. System-Overview

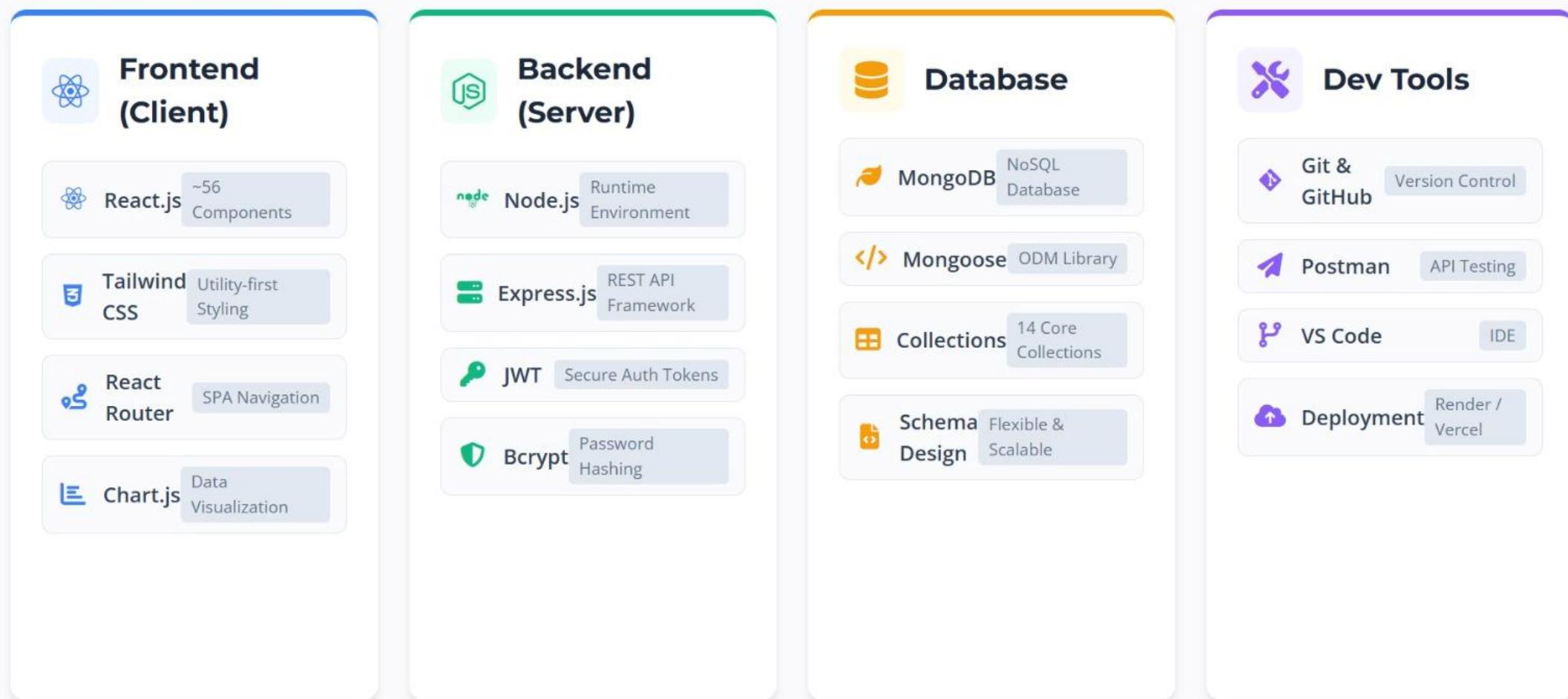


Key Features & Modules

 <h3>Authentication & Security</h3> <p>Secure JWT-based login, role-based access control (RBAC), session management, and encrypted passwords. Supports first-time login flows.</p> <p>Complete</p>	 <h3>User Management</h3> <p>Admin/HOD controls for creating and managing Teachers & Students. Includes profile editing and account status management.</p> <p>Complete</p>
 <h3>Subject Hub</h3> <p>Centralized view for syllabus, marks distribution, and exam types.</p>	 <h3>Tasks & Assignments</h3> <p>Creation, submission, and tracking with deadlines and status updates.</p>
 <h3>Digital Library</h3> <p>Subject-wise catalog of books and reference materials.</p>	 <h3>Exams & Results</h3> <p>Exam schedule publishing and student result declarations.</p>
 <h3>Attendance</h3> <p>Teacher marking interface and student attendance percentage view.</p>	 <h3>Notices Board</h3> <p>Targeted announcements based on Role, Branch, or Semester.</p>
 <h3>Notifications</h3> <p>Real-time alerts for new tasks, notices, and deadlines.</p>	 <h3>Profiles</h3> <p>Editable user profiles with academic and personal details.</p>

Technology Stack

Full MERN Stack



User Roles & Access Control



ADMIN

Scope: Global System

- ✓ Full CRUD access to Branches, Semesters & Subjects
- ✓ Manage all Users (HOD, Teacher, Student)
- ✓ Post Notices for entire college or specific groups
- ✓ Override permissions & reset passwords



HOD

Scope: Branch Level

- ✓ Manage Teachers & Students within their Branch
- ✓ Create & Edit Subjects for the Branch
- ✓ Post Notices specific to Branch Semesters
- ✓ Monitor Branch attendance reports



TEACHER

Scope: Subject Level

- ✓ Mark Attendance for assigned subjects
- ✓ Create Tasks & Assignments with deadlines
- ✓ Upload Study Materials & Notices
- ✓ View Student submissions & status



STUDENT

Scope: View Only

- ✓ View Subject Details, Marks & Exam Type
- ✓ Submit Assignments & Track Status
- ✓ View Attendance % & Daily Logs
- ✓ Access Timetable, Library & Notices

Database Design (MongoDB)

Database Stats	
Collections	14
Est. Documents	500+
Relations	Referenced

Design Strategy	
Flexible Schema:	JSON-like documents allow varying marks patterns per subject.
Data-Driven:	UI components render dynamically based on available collection data.

Structure	
Collections are grouped by functional modules:	Core, Academic, Activity, and Exam.

Schema Collections Overview (14)

CORE ACADEMIC ACTIVITY EXAMS

users Stores Students, Teachers & HODs Ref: branch, semester	admins Legacy admin accounts & credentials
branches Academic branches (IT, CE, ME)	semesters Semester definitions (Sem 1-8)
subjects Subject details, marks & syllabus Ref: branch, semester	tasks Assignments & submissions Ref: subject, createdBy
librarybooks Digital library catalog & resources	timetables Weekly class schedules Ref: branch, sem, subject
attendances Student attendance records Ref: subject, studentId	notices Targeted announcements Ref: createdBy
notifications User specific alerts & reminders Ref: userId	contact Contact form queries & feedback
examschedules Exam dates and timings Ref: subject, branch	examresults Student marks and grades Ref: student, exam, subject

Authentication Flow

Secure Login

Multi-role login with Email/Mobile & Password using JWT tokens.



First-Time Setup

Mandatory password change & security question for new users.



Role Redirection

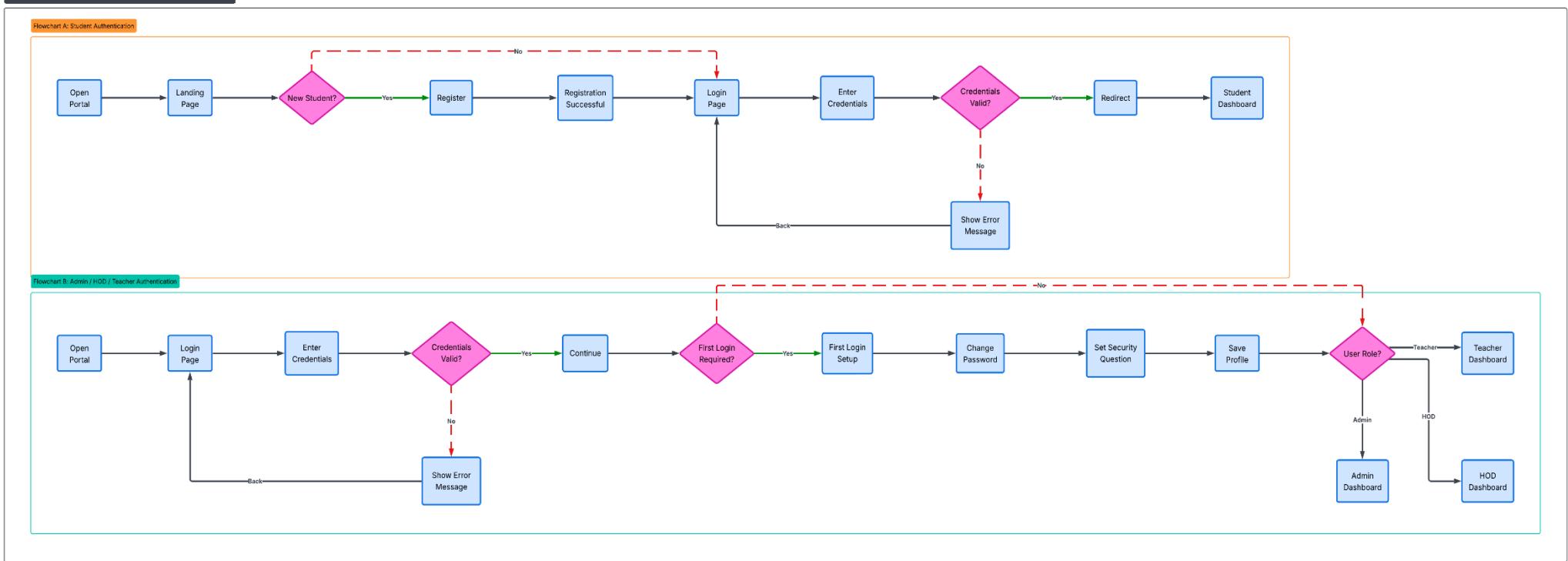
Auto-route to Admin, HOD, Teacher, or Student dashboard based on role.



Error Handling

Validation for credentials, active status, and session expiration.

Vertical Auth-First-Login Flowchart



Subject Management Flow



Structure Selection

Navigation via Branch & Semester to filter relevant subjects.



Subject Hub

Centralized view for credits, marks config, and teaching scheme.



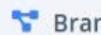
Exam Configuration

Define internal/external evaluation patterns and passing criteria.

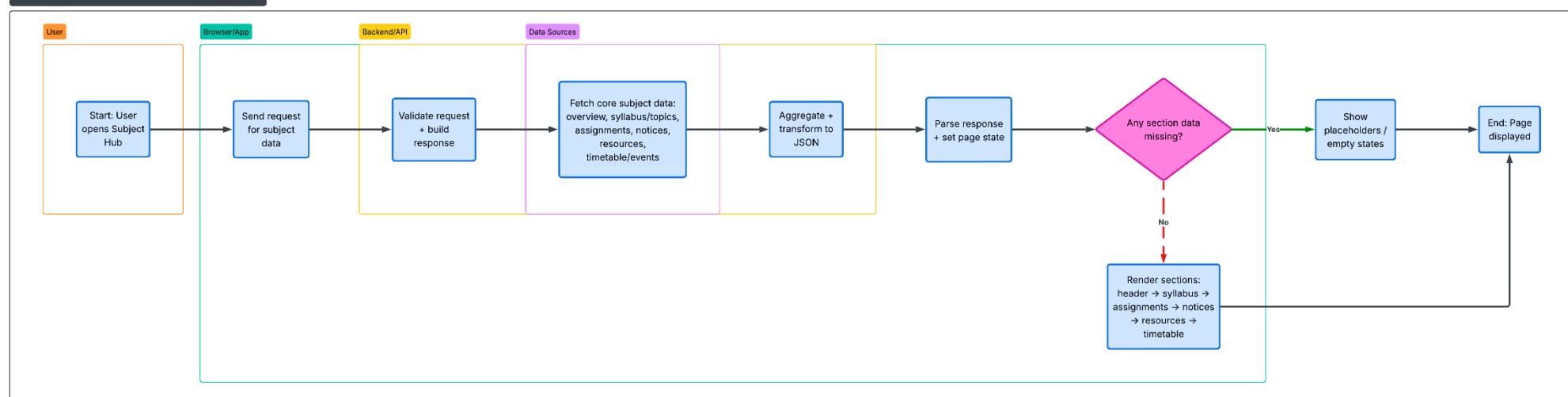


Resources

Access subject-specific study materials, assignments, and notices.



"Subject Hub Page Load Flow"



Task Creation & Submission Flow

Teacher Assignment

Create task with title, description, deadline, & target audience.

Targeted Delivery

System notifies only students in specific Branch & Semester.

Student Submission

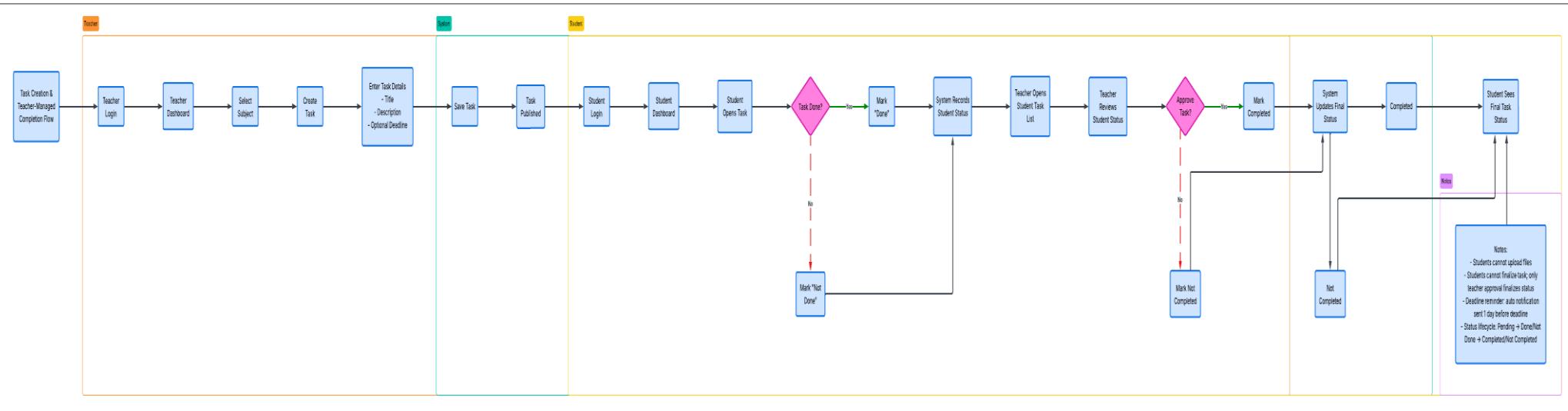
Students view details and submit responses before deadline.

Review & Status

Teacher marks 'Completed'/'Pending'; updates reflected on dashboard.

Assignment Lifecycle Process

Task Creation & Completion Flow



Attendance System Flow



Session Context

Teacher selects Branch, Semester, Subject, and Session Type (Lecture/Lab).



Fetch List

System auto-retrieves enrolled student list for the selected criteria.



Mark Status

Toggle Present/Absent/Late status efficiently and save records.

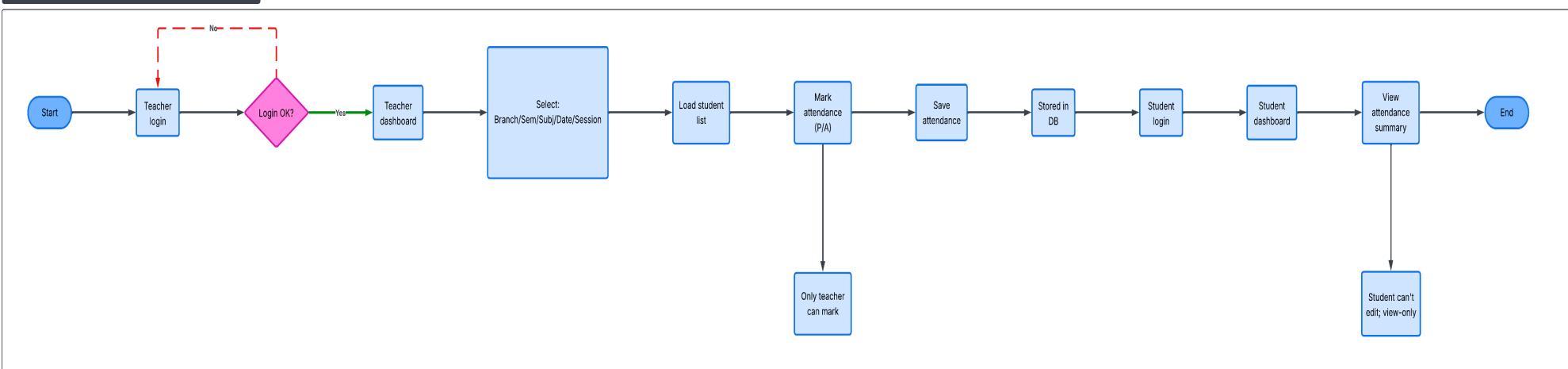


Student View

Attendance stats update immediately on the student dashboard.

Marking & Viewing Process

"Attendance Marking System Flowchart"



API Architecture & Endpoints

API Configuration

Base URL: `http://localhost:5000`
Prefix: `/api/v1`

Route Files 13

Total Endpoints 50+

Auth Method JWT Bearer

Security

All protected routes require a valid JWT token in the header. Role-based middleware ensures data privacy.

Authorization: Bearer <token>

Authentication

`POST /auth/login`

User login

`POST /auth/register`

Student signup

`POST /auth/first-login`

Setup password

Academic Structure

`GET /subjects`

List all subjects

`POST /branches`

Add new branch

`GET /semesters/:branchId`

Get sems by branch

Attendance

`POST /attendance/mark`

Save daily log

`GET /attendance/report`

Get student stats

User Management

`GET /users/profile`

`POST /admin/create-user`

`PUT /users/:id`

Tasks & Assignments

`POST /tasks/create`

`POST /tasks/:id/submit`

`GET /tasks/pending`

Notices

`GET /notices/feed`

`POST /notices/publish`

Project Status & Timeline

Current Status: ~90% Complete

Core development finished. Final documentation in progress.

Overall Progress

90%



Phase 1: Planning

COMPLETE

- ✓ Problem Statement & Objectives
- ✓ User Roles Definition
- ✓ Initial Flowcharts

Phase 2: Blueprint

COMPLETE

- ✓ Repository Setup
- ✓ MERN Stack Init
- ✓ DB Schema Design

Phase 3: Development

COMPLETE

- ✓ Auth & User Roles
- ✓ Core Modules (Subjects, Tasks)
- ✓ Attendance & Notices

Phase 4: Documentation

IN PROGRESS

- Final Report
- System Manuals
- Testing Checklist

Backend Server Ready

Frontend App Ready

Database Seeded

Live Demo Highlights

Comprehensive System Walkthrough

Showcasing the complete lifecycle of academic activities: Login → Learn → Task → Track.

▶ Full Demo

1 Access & Identity

- ✓ Show Student Login with credentials
- ✓ Demonstrate Role-Based Redirect
- ✓ Highlight Dashboard Overview

★ Key: Show secure role separation

2 Subject Hub (New!)

- ✓ Navigate to Subject Details page
- ✓ Show Marks Distribution (PA/ESE)
- ✓ Display Exam Type & Syllabus

★ Key: Centralized subject data

3 Task Lifecycle

- ✓ Teacher creates assignment + deadline
- ✓ Student views task & submits work
- ✓ Teacher reviews submission status

★ Key: Complete interaction loop

4 Targeted Notices

- ✓ Create Notice for specific Branch/Sem
- ✓ Verify visibility in Student account
- ✓ Show "New" badge indicators

★ Key: Scoped communication

5 Attendance & Reports

- ✓ Teacher marks daily attendance
- ✓ Student checks personal attendance %
- ✓ Show "Lecture vs Lab" distinction

★ Key: Real-time tracking

6 Timetable & Library

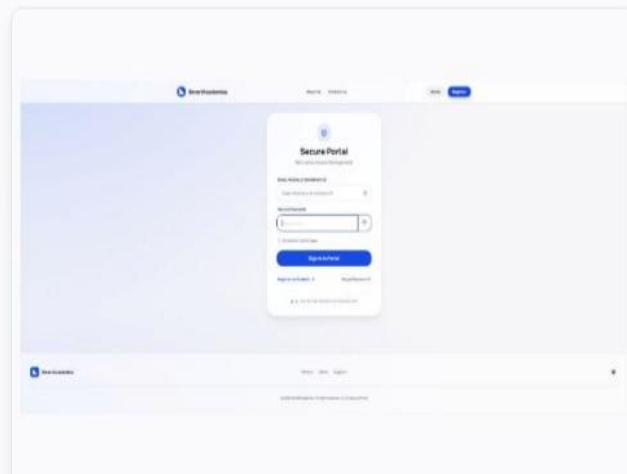
- ✓ Quick browse of Weekly Schedule
- ✓ Search Book in Digital Library
- ✓ Filter by Subject relevance

★ Key: Easy resource access

Interface Gallery

Key Interface Highlights

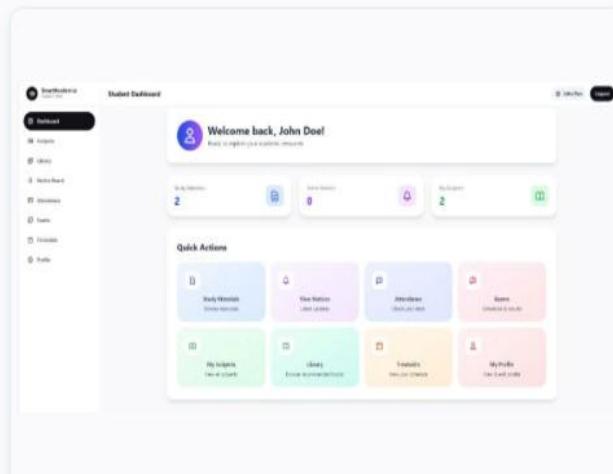
Visual overview of the primary modules and user interactions within the Smart College Academic Portal.



Secure Login

ALL USERS

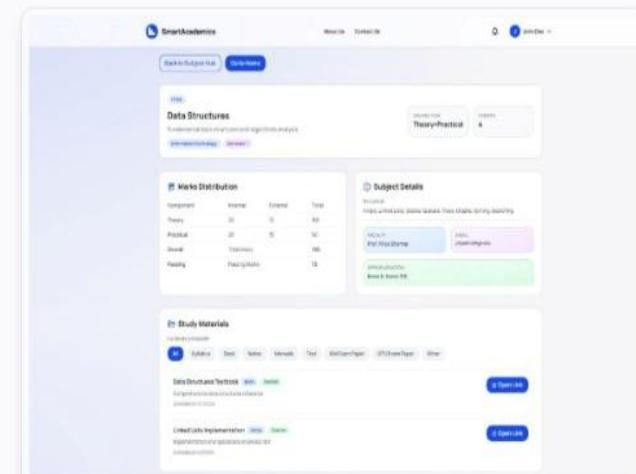
Modern authentication portal supporting Email, Mobile, or Enrollment ID.



Student Dashboard

STUDENT

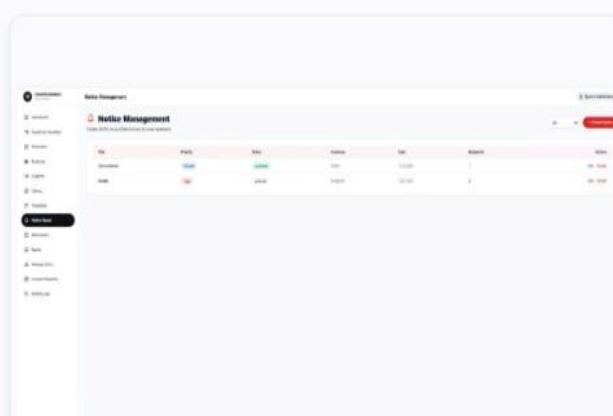
Centralized hub for stats, quick actions, materials, and notifications.



Subject Details

STUDENT

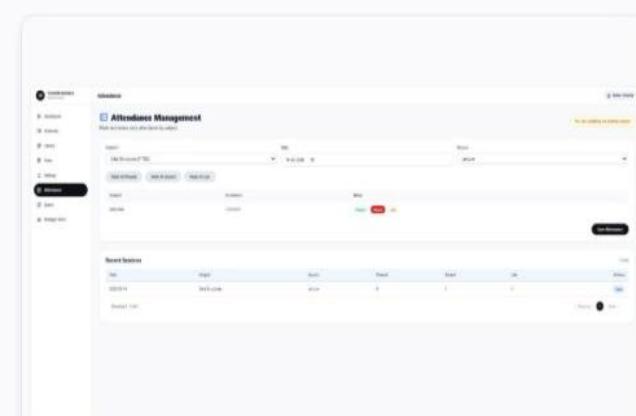
Detailed view of marks distribution, syllabus, and study materials.



Tasks

Assignments, submissions, and timelines.

[View All Tasks](#)



Attendance

Attendance

Recent Entries

No entries found. Click here to add a new entry.

Future Enhancements & Roadmap

Following the successful deployment of Phase 3 (Core Modules), the future development roadmap focuses on scalability, advanced analytics, mobile accessibility, and automated academic workflows.

Phase 4 & Beyond



Advanced Analytics

- Visual attendance trends (monthly/yearly) with low-attendance alerts.
- Student performance dashboards comparing internal vs. external marks.



Mobile & Engagement

- Progressive Web App (PWA) support for offline access and installability.
- Push notifications for assignment deadlines and urgent notices.



Resource Management

- Direct file uploads for study materials with version control.
- Digital library integration with external API for book availability.



Automated Assessment

- Online quiz module with auto-grading for objective questions.
- Grading rubrics for assignments to standardize evaluation.



DevOps & Quality

- CI/CD pipelines for automated testing and deployment.
- Comprehensive audit logs for tracking admin and user actions.



Cloud Infrastructure

- Production deployment on cloud platforms (Render/Vercel/Netlify).
- Database scaling with MongoDB Atlas dedicated clusters.

Thank You For Your Attention

? We are open for questions

This concludes our project demonstration for the Smart College Academic Portal.

Project Repository

Source code & documentation:

github.com/jayprajapati-dev/college-academic-portal

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