Project Phase 1 Submission

SMART COLLEGE ACADEMIC PORTAL

A MERN-based centralized academic management system

SUBMITTED BY

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DEPARTMENT

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SEMESTER

Semester - 5

INSTITUTION

Government Polytechnic Palanpur

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
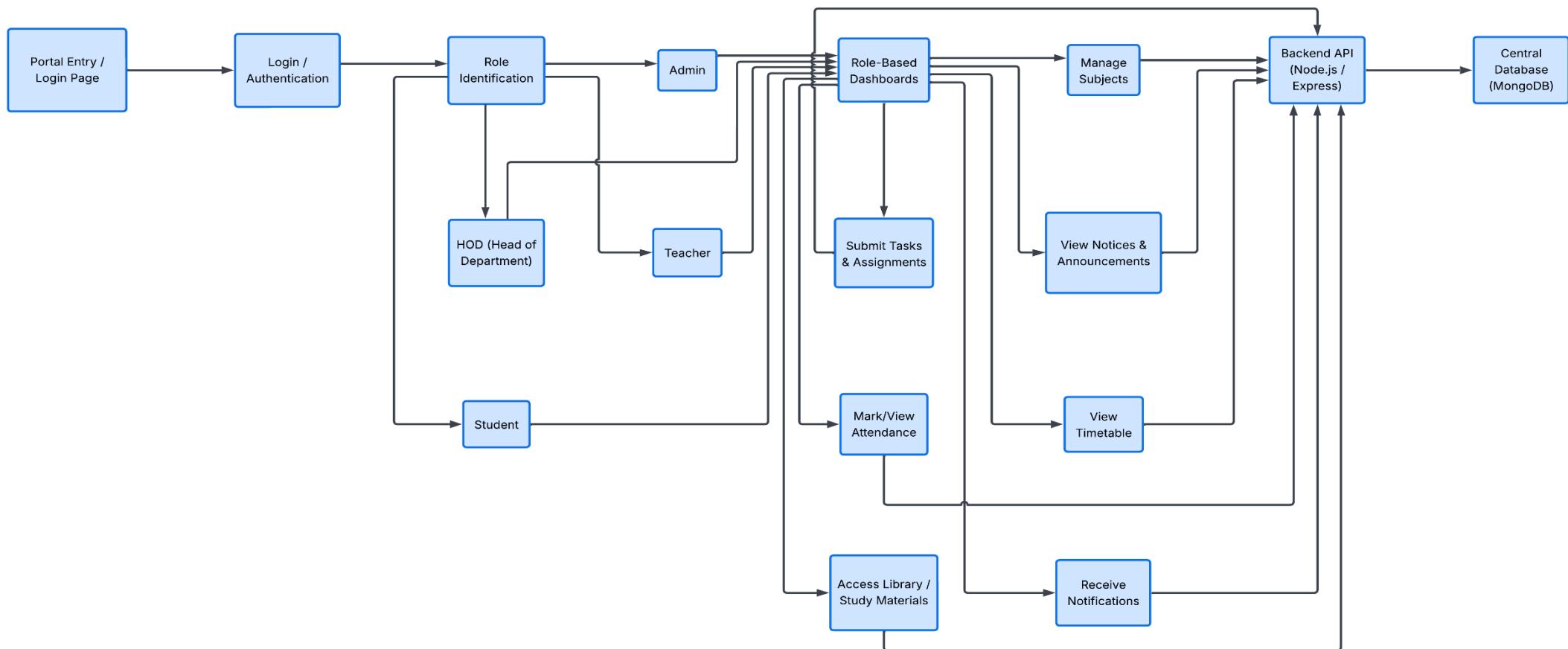
BACKEND API
Node.js + Express

DATABASE
MongoDB (NoSQL)

SECURITY
JWT Authentication

USERS
Admin   HOD   Teacher   Student

1.System-Overview
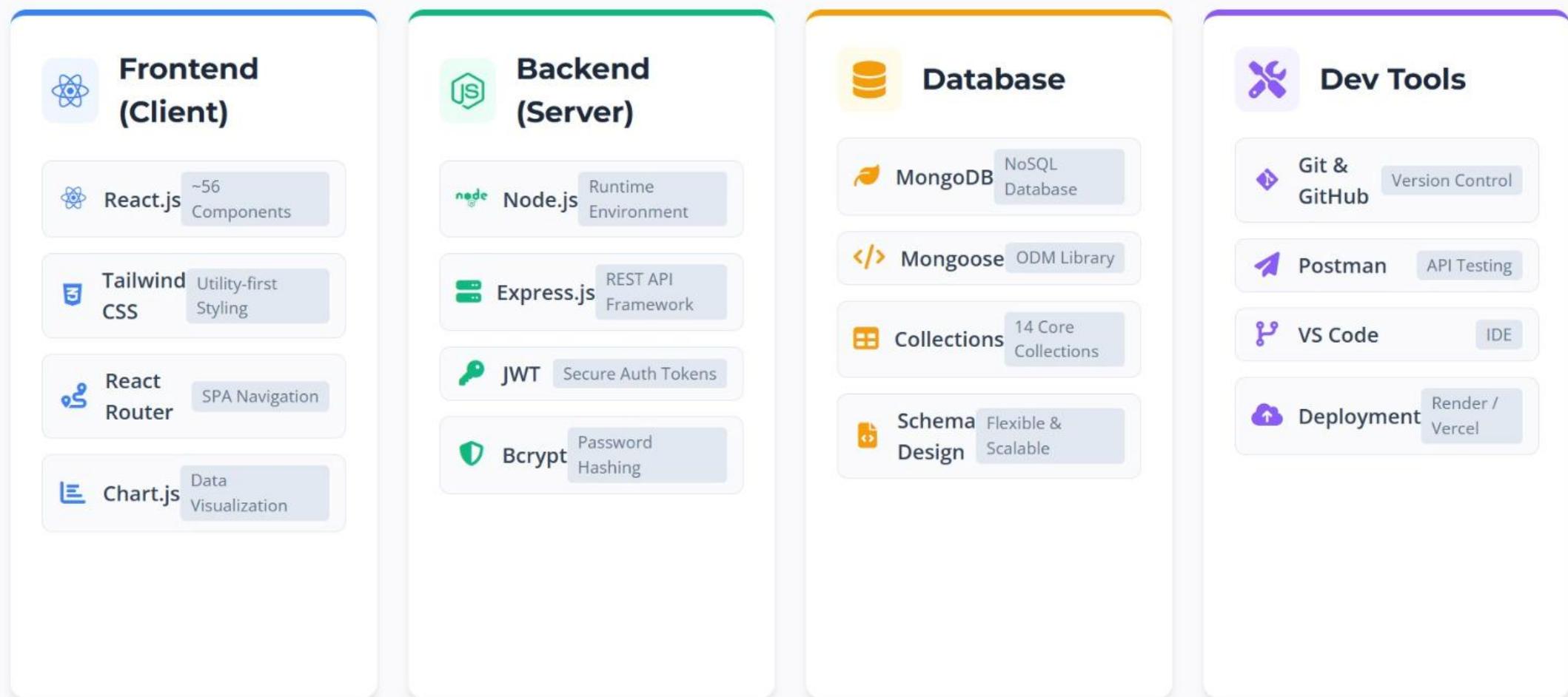
Key Features & Modules

Authentication & Security

Secure JWT-based login, role-based access control (RBAC), session management, and encrypted passwords. Supports first-time login flows.

Complete

User Management

Admin/HOD controls for creating and managing Teachers & Students. Includes profile editing and account status management.

Complete

Subject Hub

Centralized view for syllabus, marks distribution, and exam types.

Tasks & Assignments

Creation, submission, and tracking with deadlines and status updates.

Attendance

Teacher marking interface and student attendance percentage view.

Notices Board

Targeted announcements based on Role, Branch, or Semester.

Digital Library

Subject-wise catalog of books and reference materials.

Exams & Results

Exam schedule publishing and student result declarations.

Notifications

Real-time alerts for new tasks, notices, and deadlines.

Profiles

Editable user profiles with academic and personal details.

Smart College Acade

Technology Stack

Frontend (Client)

- **React.js** — ~56 Components
- **Tailwind CSS** — Utility-first Styling
- **React Router** — SPA Navigation
- **Chart.js** — Data Visualization

Backend (Server)

- **Node.js** — Runtime Environment
- **Express.js** — REST API Framework
- **JWT** — Secure Auth Tokens
- **Bcrypt** — Password Hashing

Database

- **MongoDB** — NoSQL Database
- **Mongoose** — ODM Library
- **Collections** — 14 Core Collections
- **Schema Design** — Flexible & Scalable

Dev Tools

- **Git & GitHub** — Version Control
- **Postman** — API Testing
- **VS Code** — IDE
- **Deployment** — Render / Vercel

Smart College Academic Portal • Technical Architecture

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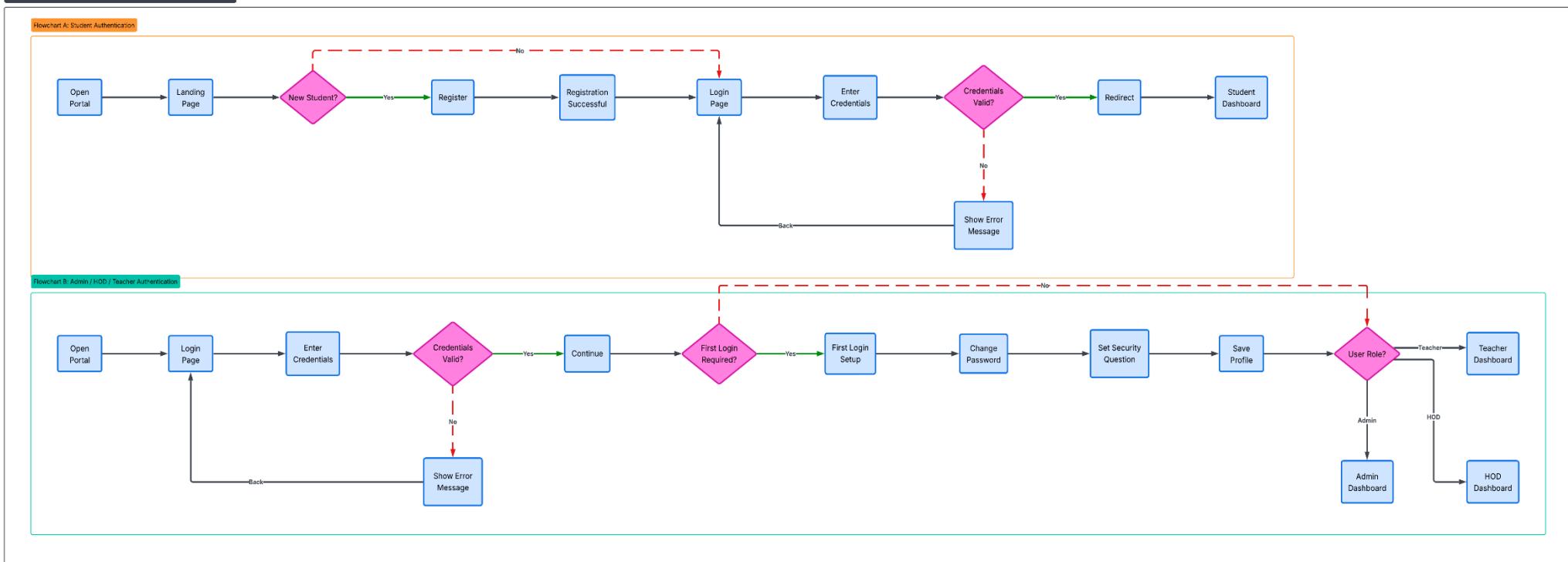
Role Redirection
Auto-route to Admin, HOD, Teacher, or Student dashboard based on role.

Error Handling
Validation for credentials, active status, and session expiration.

Vertical Auth-First-Login Flowchart

Flowchart A: Student Authentication

Open Portal → Landing Page → New Student? → Yes → Register → Registration Successful → Login Page → Enter Credentials → Credentials Valid? → Yes → Redirect → Student Dashboard

New Student? → No → Login Page

Credentials Valid? → No → Show Error Message → Back → Login Page

Flowchart B: Admin / HOD / Teacher Authentication

Open Portal → Login Page → Enter Credentials → Credentials Valid? → Yes → Continue → First Login Required? → Yes → First Login Setup → Change Password → Set Security Question → Save Profile → User Role?

Credentials Valid? → No → Show Error Message → Back → Login Page

First Login Required? → No → User Role?

User Role? → Teacher → Teacher Dashboard
User Role? → Admin → Admin Dashboard
User Role? → HOD → HOD Dashboard

Smart College Academic Portal • Security & Access Flow

Subject Management Flow

Structure Selection
Navigation via Branch & Semester to filter relevant subjects.

Subject Hub
Centralized view for credits, marks config, and teaching scheme.
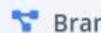
Exam Configuration
Define internal/external evaluation patterns and passing criteria.
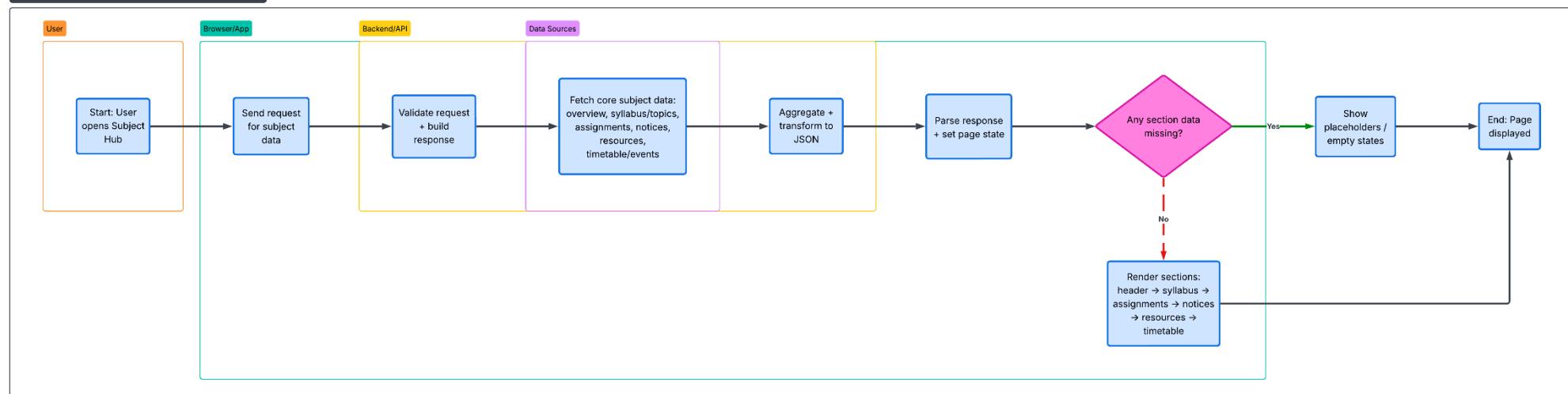
Resources
Access subject-specific study materials, assignments, and notices.

Branch → Semester → Subject Details Flow

"Subject Hub Page Load Flow"

User	Browser/App	Backend/API	Data Sources

- Start: User opens Subject Hub
- Send request for subject data
- Validate request + build response
- Fetch core subject data: overview, syllabus/topics, assignments, notices, resources, timetable/events
- Aggregate + transform to JSON
- Parse response + set page state
- Any section data missing?
  - Yes → Show placeholders / empty states
  - No → Render sections: header → syllabus → assignments → notices → resources → timetable
- End: Page displayed

Smart College Academic Portal • Academic Structure & Content

Task Creation & Submission Flow

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

Targeted Delivery
System notifies only students in specific Branch & Semester.
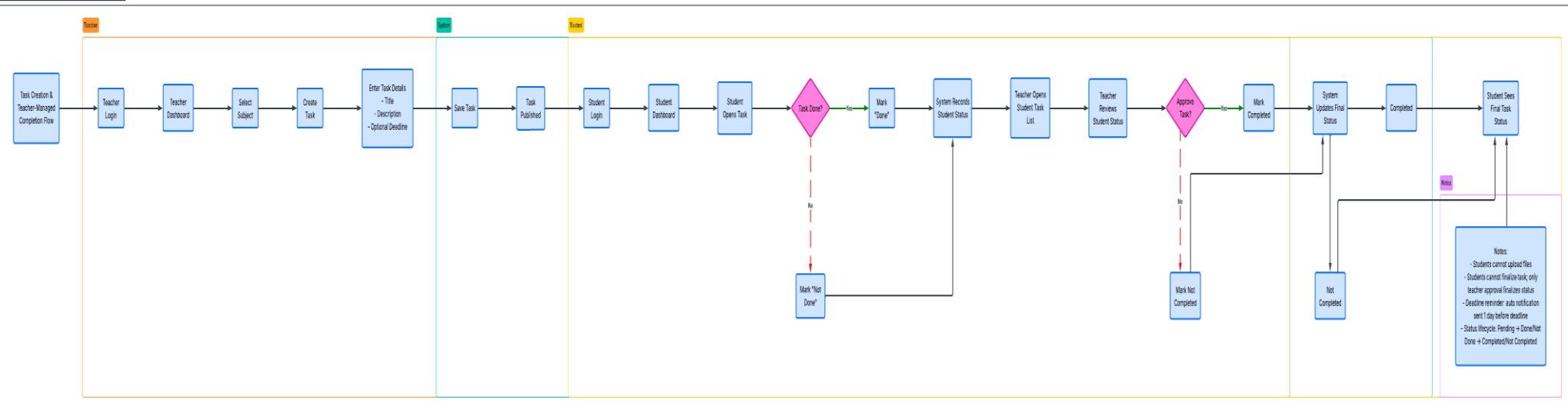
Student Submission
Students view details and submit responses before deadline.

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

Assignment Lifecycle Process

Task Creation & Completion Flow

Notes:
- Students cannot upload files
- Students cannot finalize task; only teacher approval finalizes status
- Deadline reminder: auto notification sent 1 day before deadline
- Status lifecycle: Pending → Done/Not Done → Completed/Not Completed

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.
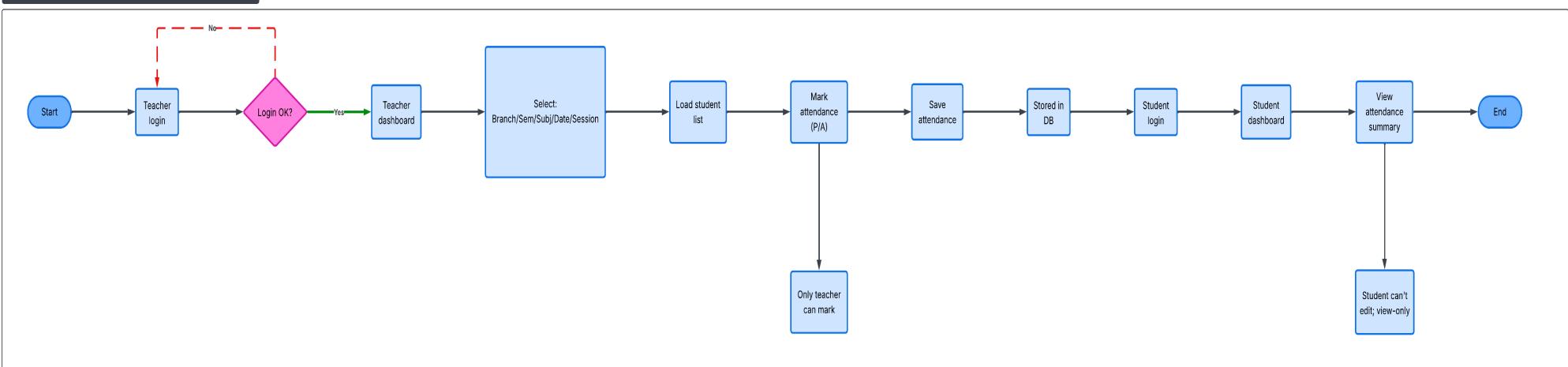
Student View
Attendance stats update immediately on the student dashboard.

Marking & Viewing Process

"Attendance Marking System Flowchart"

Start → Teacher login → Login OK? → (No, loops back to Teacher login) / (Yes) → Teacher dashboard → Select: Branch/Sem/Subj/Date/Session → Load student list → Mark attendance (P/A) → Save attendance → Stored in DB → Student login → Student dashboard → View attendance summary → End

Mark attendance (P/A) → Only teacher can mark

View attendance summary → Student can't edit; view-only

API Architecture & Endpoints

🗄 API Configuration

```
Base URL: http://localhost:500
0
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
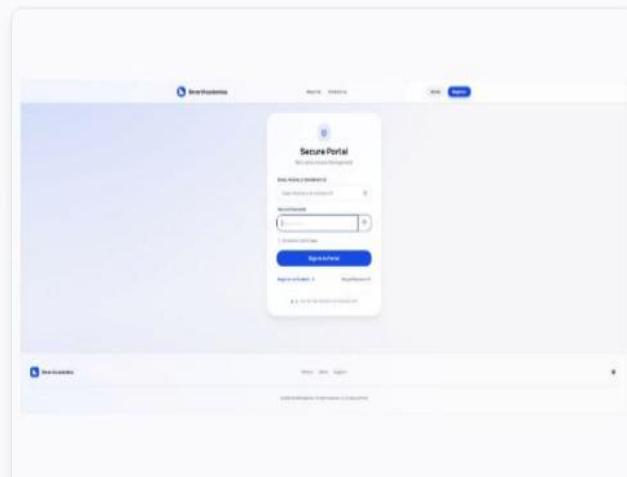
- ✓ Quick browse of Weekly Schedule
- ✓ Search Book in Digital Library
- ✓ Filter by Subject relevance

★ Key: Easy resource access

Interface Gallery

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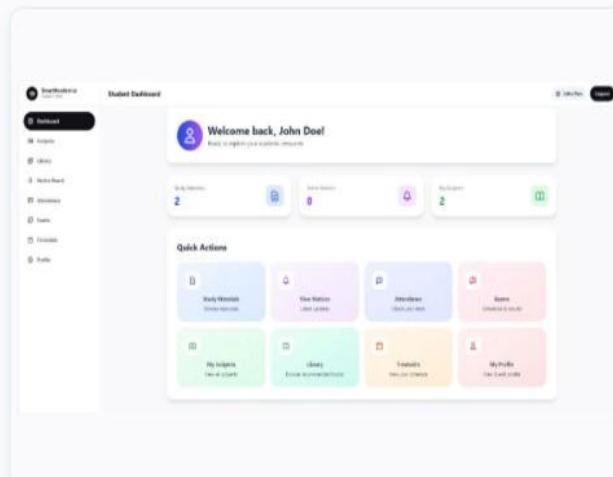
Visual overview of the primary modules and user interactions within the Smart College Academic Portal.


Secure Login   ALL USERS
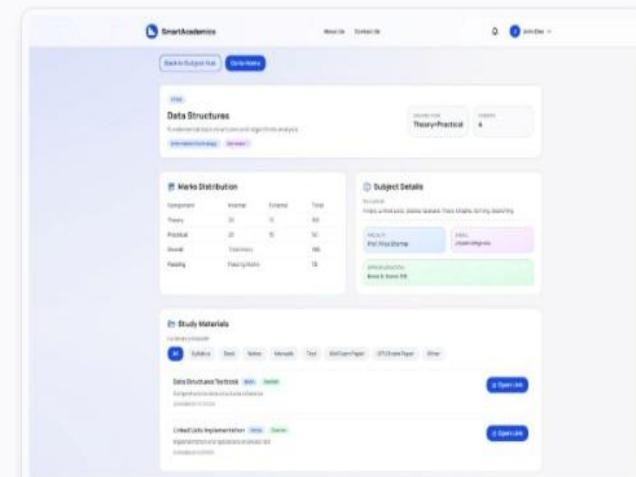
Modern authentication portal supporting Email, Mobile, or Enrollment ID.


Student Dashboard   STUDENT
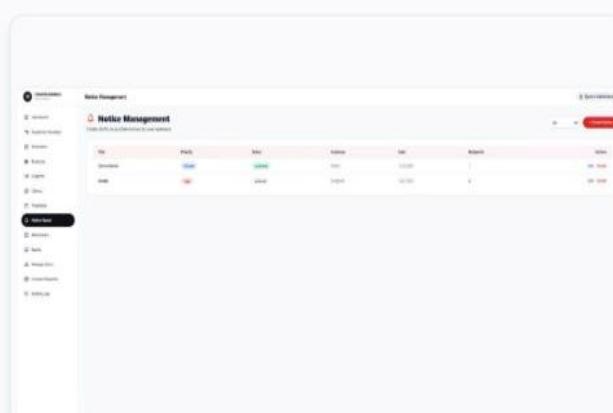
Centralized hub for stats, quick actions, materials, and notifications.

Subject Details   STUDENT
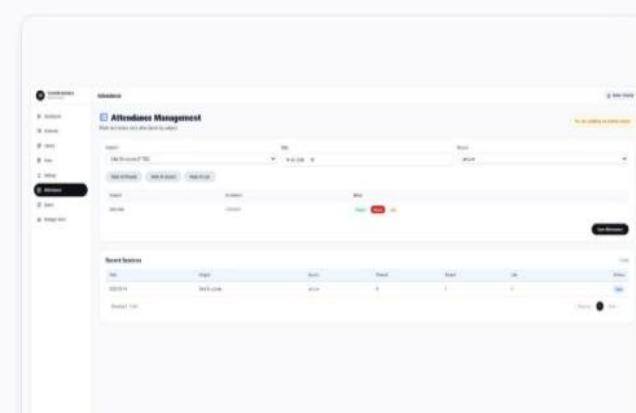
Detailed view of marks distribution, syllabus, and study materials.

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.

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🏛 Academic Details

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