

## 1. Project Scope Summary

This MERN Stack College Website Project includes features for Students, Teachers, Admins, and Public Visitors

Students:

- View Courses, Events, and Announcements
- Apply for Admission via Formik + MongoDB
- Login/Registration with JWT
- Dashboard with Timetable & Grades
- Communication with Teachers

Teachers:

- Login-protected Dashboard
- Attendance & Grade Management
- Assignment Upload (Multer + Cloudinary)
- Post Announcements

Admins:

- Manage All Users (CRUD)
- Upload Timetables and Send Notifications
- Review Admission Applications

Visitors:

- About Page, Courses Offered, Event Gallery
- Contact Form with Validation and Google Maps

## 2. MVC Architecture Used

Model-View-Controller Pattern Applied:

Model:

- MongoDB + Mongoose schemas like User, Course, Application

View:

- React.js Frontend with Redux Toolkit for UI State

Controller:

- Express.js Route Handlers e.g., authController, courseController

Examples:

- models/User.js: defines schema and roles
- controllers/applicationController.js: admission form logic
- views/StudentDashboard.jsx: student-side interface

## 3. Technology Stack

Frontend: React.js + Redux Toolkit  
Routing: React Router DOM  
Backend: Node.js + Express.js  
Database: MongoDB Atlas  
Authentication: JWT (Access + Refresh Token)  
File Upload: Multer + Cloudinary  
Form Handling: Formik + Yup  
Deployment: Vercel (Frontend), Render/Railway (Backend)

## 4. Project Development Phases

Phase 1: Setup (1-2 Days)

- Initialize client/server, connect MongoDB, setup repo

Phase 2: Authentication (2-4 Days)

- JWT auth, registration/login, protected routes

Phase 3: Frontend Pages (5-7 Days)

- Public + Role-based Dashboards with Responsive UI

Phase 4: Backend API (5-7 Days)

- CRUD APIs for Students, Courses, Teachers, Applications

Phase 5: Integration + Redux (3-4 Days)

- Connect APIs to UI with loading/error handling

Phase 6: Testing + Optimization (2-3 Days)

- Test routes, validate forms, optimize assets

Phase 7: Deployment (1-2 Days)

- Deploy frontend/backend, set environment variables

## 5. Final Time Estimation (Team of 3)

Setup + Auth: 3-4 Days (All)

UI/Pages: 5 Days (Frontend Dev)

Backend APIs: 5 Days (Backend Dev)

Integration + Redux: 3 Days (Integrator)

Testing + Deployment: 3 Days (All)

Total: 12-15 Days realistic with a focused team of 3 developers.