# Virtual Classroom System

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## 1. Abstract

The Virtual Classroom System is a full-stack web application designed to facilitate remote learning by enabling teachers to share recorded classes and materials with students. It provides a user-friendly interface for teachers to upload video lectures and assignments, and for students to view content, submit assignments, and track progress. The platform supports structured access, secure login, and scalable backend storage using modern web technologies.

## 2. Objective

- To create a virtual learning platform tailored for recorded class delivery.

- To allow admin-controlled teacher registration.

- To enable student self-registration and seamless content access.

- To provide a backend system for managing assignments and submissions.

## 3. Tech Stack

- Frontend: React.js

- Backend: Node.js with Express.js

- Database: MongoDB

- Video Storage: Google Drive (links stored in DB)

- Authentication: Role-based login system (Teacher / Student)

## 4. System Architecture

- Admin Panel: Fixed admin manually registers teachers.

- Teacher Role: Can upload video content (Google Drive links), manage assignments.

- Student Role: Can sign up, view recorded classes, and submit assignments.

- Database Structure:

- teachers collection in Virtual database

- students collection in Virtual database

- Video links and assignment details stored per course/module

## 5. Modules

1. User Authentication Module

- Role-based login (Teacher/Student)

- Secure credential storage

2. Video Management Module

- Upload and link recorded classes

- Organized by subjects/modules

3. Assignment Module

- Teachers can post assignments

- Students can submit responses with file uploads

4. Dashboard

- Separate dashboards for teacher and student

- Summary of recent classes, submissions, and notifications

## 6. Key Features

- Recorded class model for flexible access

- Admin-controlled onboarding of teachers

- Real-time student registration

- Assignment management system

- MongoDB-based data persistence

- Clean and intuitive React-based UI

- Scalable backend with Express.js

- Secure, role-based access control

## 7. Future Enhancements

- Implement notifications for assignments and updates

- Add analytics for student engagement

- Enhance UI/UX with dynamic filtering and sorting

- Enable profile management for students and teachers

- Option to integrate third-party services like cloud storage

## 8. Conclusion

This Virtual Classroom System provides a robust, scalable, and user-friendly solution for educational institutions to manage and deliver recorded course content. It bridges the gap between teachers and students in remote learning environments and offers a solid base for future academic features.