

**“Online Examination Management System”**

Project Report submitted

*by*

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Under the guidance of

**Mr. PRASHANTH KUMAR**

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**Department of Information Science and Engineering**

NMAM Institute of Technology, Nitte

2025 – 2026

*In partial fulfillment of the requirements for the award of the Degree of  
Bachelor of Engineering in Information Science and Engineering*

Department of Information Science & Engineering NMAM Institute of Technology,  
Nitte - 574110  
(Affiliated to NITTE (Deemed to be University) Mangalore)



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OF TECHNOLOGY**

**DEPARTMENT OF INFORMATION SCIENCE AND  
ENGINEERING**

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*is a Bonafide work carried out by*

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*(Signature of the Faculty)*



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## **Abstract**

The Online Examination Management System (OEMS) is a web-based platform designed to conduct, manage, and monitor examinations in a secure and efficient manner. Developed as part of the academic curriculum at NMAM Institute of Technology, Nitte, the system addresses the limitations of traditional and existing online examination tools by integrating role-based access control, real-time monitoring, and automated evaluation.

The system enables different user roles—including Super Admins, Admins, Teachers, and Students—to perform specific operations such as academic setup, exam creation, scheduling, and participation. Teachers and administrators can create examinations with structured multiple-choice questions, define evaluation criteria, and manage exam configurations for both online and center-based modes.

A key feature of OEMS is its integrated proctoring system, which enhances exam integrity through webcam monitoring, screen tracking, and browser activity detection. The system leverages AI-based techniques to identify suspicious behaviors such as multiple persons, mobile usage, and tab switching, ensuring fairness during examinations. Detected violations are logged with supporting evidence for further review.

The backend is implemented using FastAPI with a MySQL relational database for structured data storage, while cloud storage is utilized for handling proctoring evidence. The system also provides automated result generation, performance analytics, and report export features in PDF and CSV formats.

Overall, OEMS delivers a scalable and secure examination environment by combining modern web technologies with intelligent monitoring mechanisms, making it suitable for academic institutions seeking reliable digital assessment solutions.

# 1. Introduction

In the digital era, conducting examinations through online platforms has become increasingly important across academic institutions. Traditional examination methods are time-consuming, prone to manual errors, and lack scalability. Existing online examination systems often suffer from limitations such as weak authentication mechanisms, lack of proper monitoring, and vulnerability to unfair practices during exams.

The Online Examination Management System (OEMS) is designed to address these challenges by providing a secure, scalable, and efficient platform for managing the complete examination lifecycle. The system supports multiple user roles, including Super Admins, Admins, Teachers, and Students, enabling structured management of academic data, exam scheduling, and participation.

A key feature of OEMS is its integrated proctoring system, which enhances examination integrity through real-time monitoring. The system detects suspicious activities such as tab switching, multiple person presence, and mobile usage using AI-based techniques and browser-level event tracking. Additionally, OEMS automates evaluation, result generation, and performance analytics, reducing manual effort and improving accuracy.

The system is developed using modern web technologies, with a FastAPI-based backend, MySQL database for structured data storage, and a responsive frontend built using HTML, CSS, and JavaScript. This combination ensures a robust and production-ready examination platform.

## 1.1 Objectives

The primary objectives of the Online Examination Management System include:

- To provide a secure and reliable platform for conducting online examinations
- To implement role-based access control for different types of users
- To enable efficient exam creation, scheduling, and management

- To ensure exam integrity through AI-based proctoring and real-time monitoring
- To automate evaluation and result generation processes
- To provide analytical insights and reporting features for performance evaluation

## **1.2 Scope**

The scope of this project includes the design, development, and deployment of a comprehensive examination management system. It covers user authentication, academic setup, exam creation, question management, exam execution, proctoring, result processing, and analytics.

The system supports both online and center-based examination modes, making it adaptable to different institutional requirements. It is designed primarily for academic institutions where secure and controlled examination environments are essential.

## **1.3 Problem Statement**

Traditional and many existing online examination systems lack robust mechanisms to ensure fairness, security, and scalability. Issues such as unauthorized access, cheating through external devices, lack of monitoring, and delayed result processing reduce the effectiveness of these systems.

There is a need for a system that not only facilitates online examinations but also ensures integrity through continuous monitoring, secure authentication, and structured evaluation. The Online Examination Management System (OEMS) is proposed to address these challenges by integrating role-based access control, AI-based proctoring, automated evaluation, and comprehensive analytics within a unified platform.

## 2. Details

### 2.1 System Architecture

The Online Examination Management System (OEMS) follows a **modular, three-tier architecture** consisting of the Presentation Layer, Application Layer, and Data Layer. This design ensures scalability, maintainability, and separation of concerns.

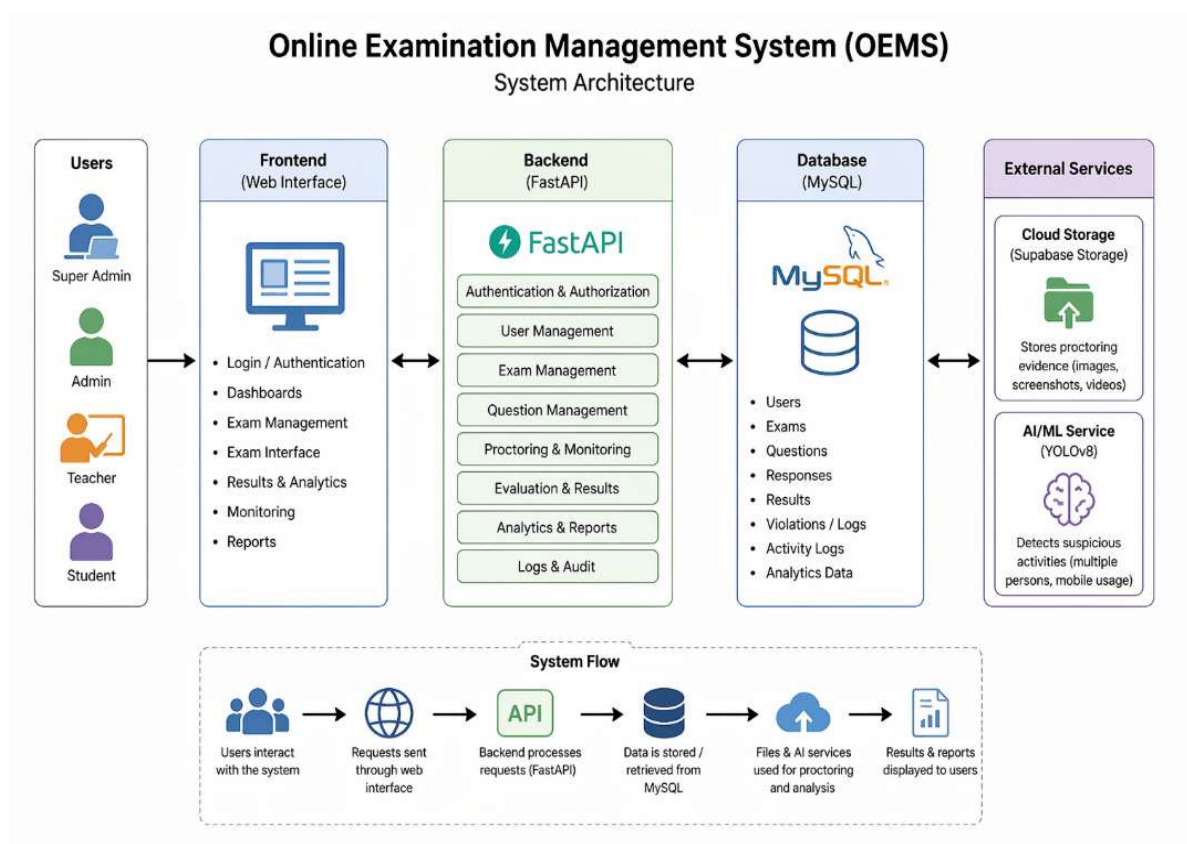


Figure 2.1: System Architecture

## 2.2 Implementation

### 2.2.1 ER Diagram

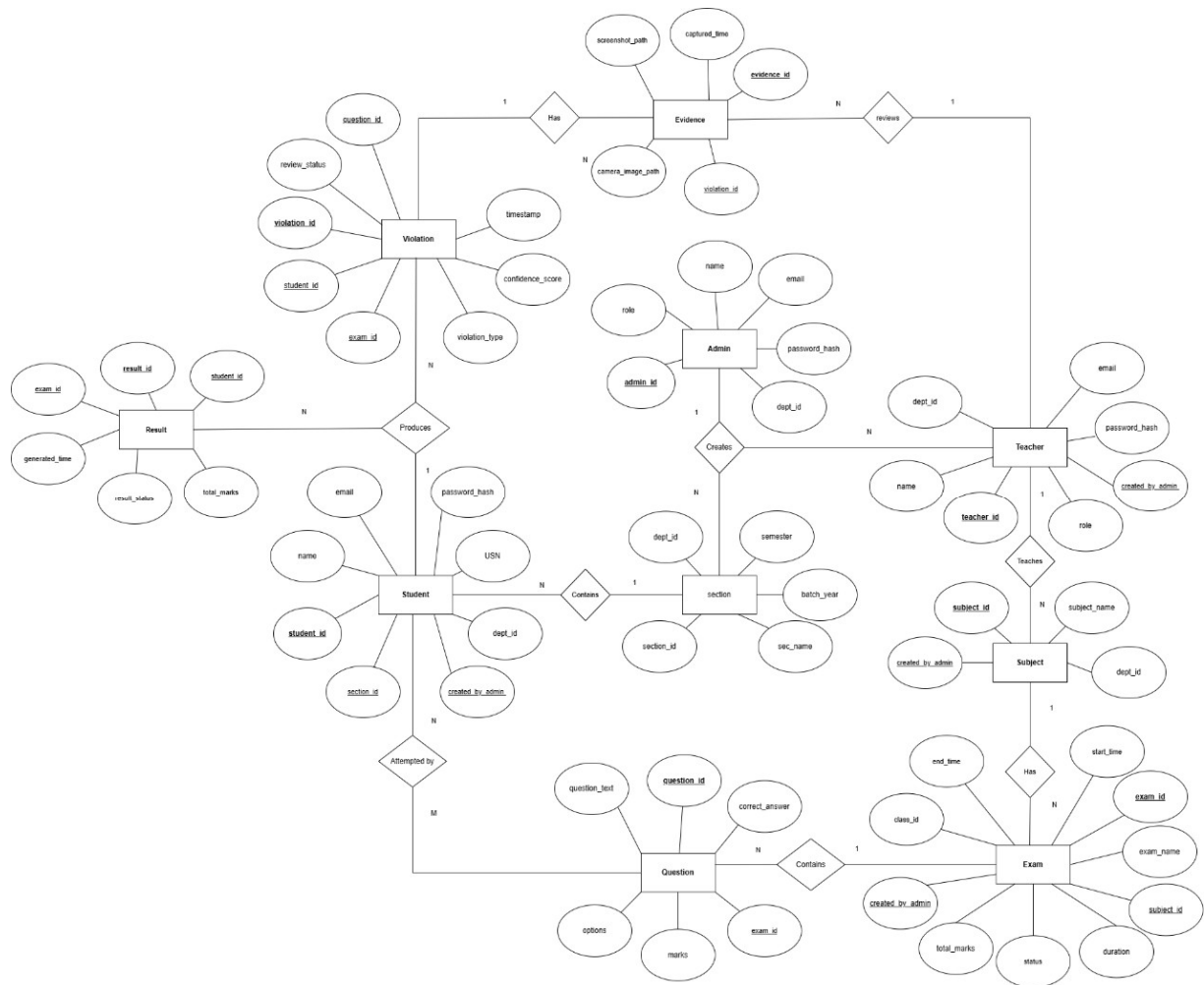
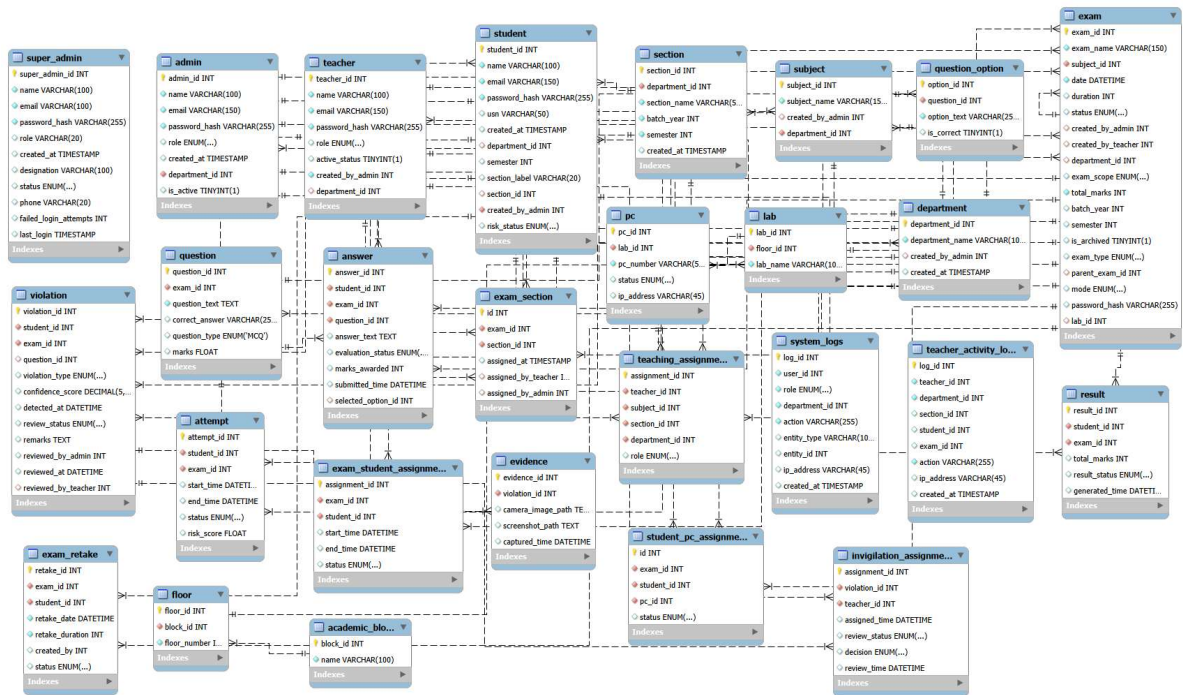


Figure 2.2.1: ER Diagram

## 2.2.2 Tables



2.2.2 Tables in the DB

## 2.2.4 Presentation Layer (Frontend)

The frontend is developed using **HTML5**, **CSS3**, and **Vanilla JavaScript**, following a **Multi-Page Application (MPA)** approach with partial Single-Page Application (SPA) behavior. Each user role (Student, Teacher, Admin, Super Admin) has a dedicated dashboard interface. Dynamic navigation within dashboards is handled through DOM manipulation without full page reloads.

Interactive visualizations are implemented using **Chart.js**, while **jsPDF** enables export of reports. A custom **Proctoring Client** captures webcam streams, screen activity, and browser events to monitor exam integrity.

### 2.2.5 Application Layer (Backend)

The backend is built using **FastAPI**, a high-performance Python framework for RESTful API development. The system follows a modular API design using **APIRouter**, separating logic based on roles and functionalities.

Data validation is handled using **Pydantic models**, ensuring type safety and structured request handling. The backend also enforces **Role-Based Access Control (RBAC)** through dependency injection, restricting access based on user roles.

### 2.2.6 Data Layer

The system uses a **MySQL relational database** for structured data storage and **Supabase Storage** for handling binary files such as proctoring evidence.

All database operations are executed using **parameterized SQL queries**, ensuring performance and protection against SQL injection.

### 2.2.7 Deployment Architecture

The frontend is deployed as a static application using a web server or CDN, while the backend runs on an ASGI server such as Uvicorn. The database is hosted on a managed MySQL instance, and cloud storage is handled via Supabase.

## 2.3 Technology Stack

Component	Technology	Purpose
Frontend	HTML5, CSS3, JavaScript	UI rendering and interaction
Charts	Chart.js	Data visualization
PDF Export	jsPDF, AutoTable	Report generation
Backend	FastAPI (Python)	REST API and business logic

Validation	Pydantic	Data validation
Database	MySQL	Relational data storage
Storage	Supabase	Proctoring evidence storage
Auth	JWT + bcrypt	Secure authentication

**Table 2.3: Technology Stack Used in OEMS**

## 2.4 Database Design

The system uses a **normalized relational database schema** divided into multiple domains:

### User & Organization

- Department, Admin, Teacher, Student
- Enforces hierarchical academic structure

### Academic Structure

- Subjects, Sections, Teaching Assignments
- Junction tables used for many-to-many mapping

### Exam Management

- Exams, Questions, Options
- Supports both ONLINE and CENTER exam modes

### Execution & Results

- Attempts, Answers, Results
- Ensures one submission per student per exam

### Proctoring

- Violations, Evidence
- Stores AI-detected anomalies and supporting proof

### Infrastructure

- Blocks → Floors → Labs → PCs
- Enables physical exam center mapping

## 2.5 Modules and Features

Module	Description
<b>User Authentication</b>	Handles login, JWT session management, and role-based routing.
<b>Dashboard Module</b>	Provides role-specific interfaces with analytics and navigation.
<b>Academic Management Module</b>	Manages departments, subjects, sections, and user assignments.
<b>Exam Management Module</b>	Allows creation, scheduling, and configuration of exams.
<b>Exam Execution Module</b>	Provides a controlled interface for students to attempt exams.
<b>Proctoring Module</b>	Monitors user activity using: <ul style="list-style-type: none"><li>• Webcam detection</li><li>• Screen monitoring</li><li>• Tab-switch detection</li></ul>
<b>Analytics Module</b>	Generates performance insights using charts and reports.
<b>Logging Module</b>	Maintains audit trails for system actions and security.

*Table 2.5: Modules of OEMS*

**Table 2.5 summarizes the major functional modules of the Online Examination Management System (OEMS).**

Each module is designed to handle a specific aspect of the system, including authentication, academic setup, exam management, execution, proctoring, analytics, and system logging.

## **2.6 System Workflow**

### **Phase 1: Setup**

- Super Admin creates departments and infrastructure
- Admin configures subjects, sections, and users

### **Phase 2: Exam Creation**

- Teacher creates exam and adds questions
- Exam is configured (ONLINE or CENTER mode)

### **Phase 3: Execution**

- Student logs in and starts exam
- Proctoring system activates
- Violations are monitored in real-time

### **Phase 4: Submission**

- Answers are submitted and stored
- System evaluates responses automatically

### **Phase 5: Post-Exam**

- Teachers review violations
- Analytics and reports are generated
- Results exported (PDF/CSV)

## 2.7 User Interface Screens

The Online Examination Management System (OEMS) is designed as a modular, scalable, and secure system that integrates multiple components to handle exam lifecycle management, real-time monitoring, and result processing. The system follows a **layered and component-based design**, ensuring separation of concerns and efficient interaction between modules.

### System Components

The system is divided into the following core components:

#### User Interface Layer

This layer consists of role-specific dashboards for Students, Teachers, Admins, and Super Admins.

It handles:

- User interaction and navigation
- Form inputs and validations
- Display of analytics, reports, and exam interfaces

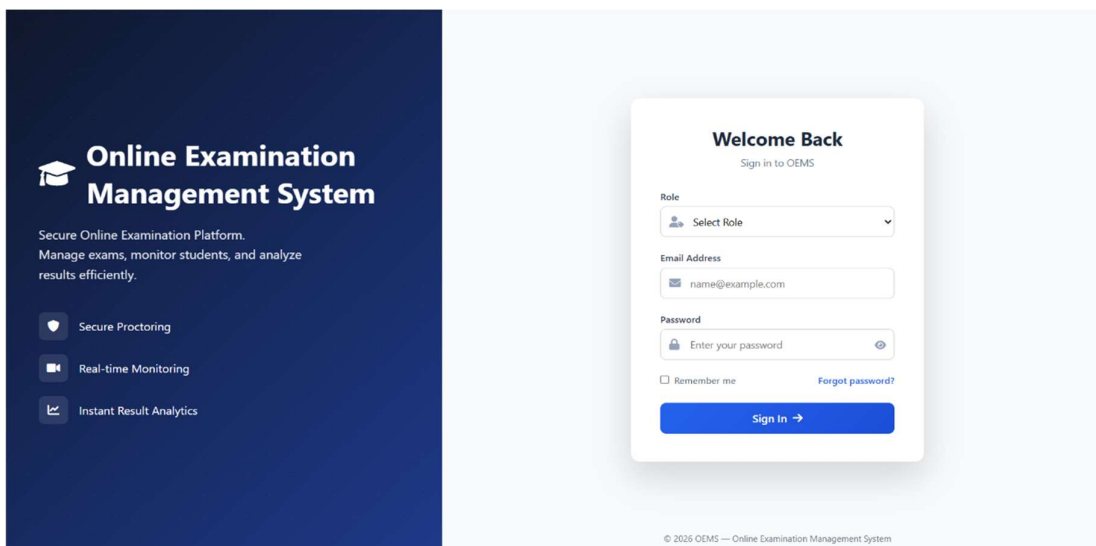
The UI dynamically updates content using JavaScript without frequent page reloads, improving responsiveness.

### **2.7.1 Landing Page**

The landing page is the initial interface presented to users when accessing the Online Examination Management System (OEMS). It serves as an entry point to the platform and provides a clear overview of the system's purpose and functionality.

The page prominently displays the system's core objective, which is to provide a secure and efficient online examination environment with integrated proctoring features. It includes a brief description highlighting key capabilities such as role-based access, real-time monitoring, and automated evaluation.

Navigation options such as **Login** and **Get Started** are provided, allowing users to quickly access the authentication page. The layout is designed to be simple and intuitive, ensuring ease of use for all categories of users.



**Figure 2.7.1: Landing Page – Hero Section**

### **2.7.2 User Login**

The User Login page provides secure access to the Online Examination Management System (OEMS) for all registered users, including Super Admins, Admins, Teachers, and Students. It acts as the primary authentication gateway to the system.

The login interface requires users to enter their **email** and **password**, along with selecting their respective role. Upon submission, the credentials are sent to the backend for verification.

If the credentials are valid:

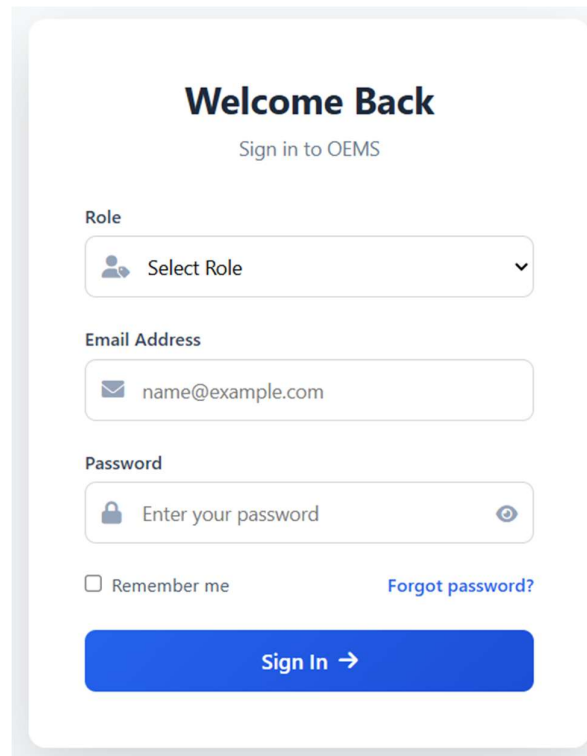
- A **JSON Web Token (JWT)** is generated by the backend
- The token is stored on the client side
- The user is redirected to their respective dashboard based on their role

If authentication fails, appropriate error messages are displayed to guide the user.

The login system ensures:

- **Secure authentication** using encrypted passwords (bcrypt hashing)
- **Role-based redirection** to appropriate dashboards
- **Session management** using token-based authentication

Additionally, the system includes mechanisms such as **session timeout and re-authentication prompts** to enhance security.



The image shows a user login form titled "Welcome Back" with the subtitle "Sign in to OEMS". The form contains three input fields: "Role" (a dropdown menu with "Select Role" and a person icon), "Email Address" (a text field with "name@example.com" and an envelope icon), and "Password" (a text field with "Enter your password" and a lock icon). Below the password field, there is a checkbox for "Remember me" and a link for "Forgot password?". At the bottom of the form is a blue "Sign In" button with a right-pointing arrow.

**Fig: 2.7.2: User Login**

### 2.7.3 Dashboard

The dashboard is the central interface of the Online Examination Management System (OEMS), providing role-specific access to system functionalities. Each user—Super Admin, Admin, Teacher, and Student—is presented with a customized dashboard tailored to their responsibilities and permissions.

#### a) Super Admin Dashboard

The Super Admin dashboard provides complete system-level control and configuration capabilities.

Key functionalities include:

- Managing departments and assigning Admins
- Configuring infrastructure such as blocks, floors, labs, and PCs
- Viewing system-wide analytics and logs
- Monitoring overall system activity

This dashboard enables centralized management of the entire platform.

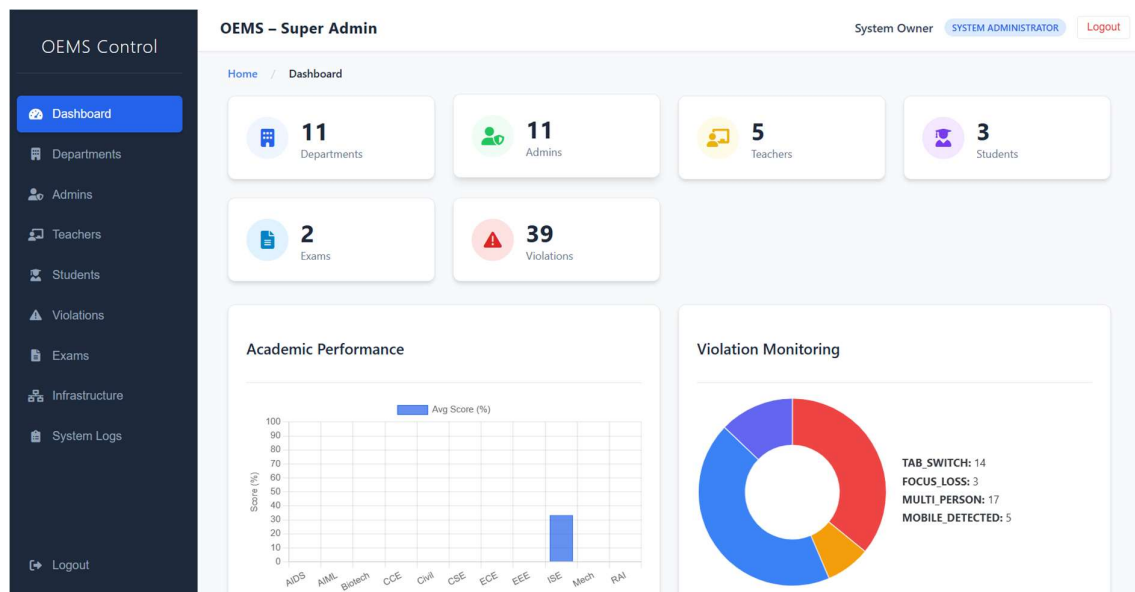


Fig 2.7.3 a): Super Admin Dashboard

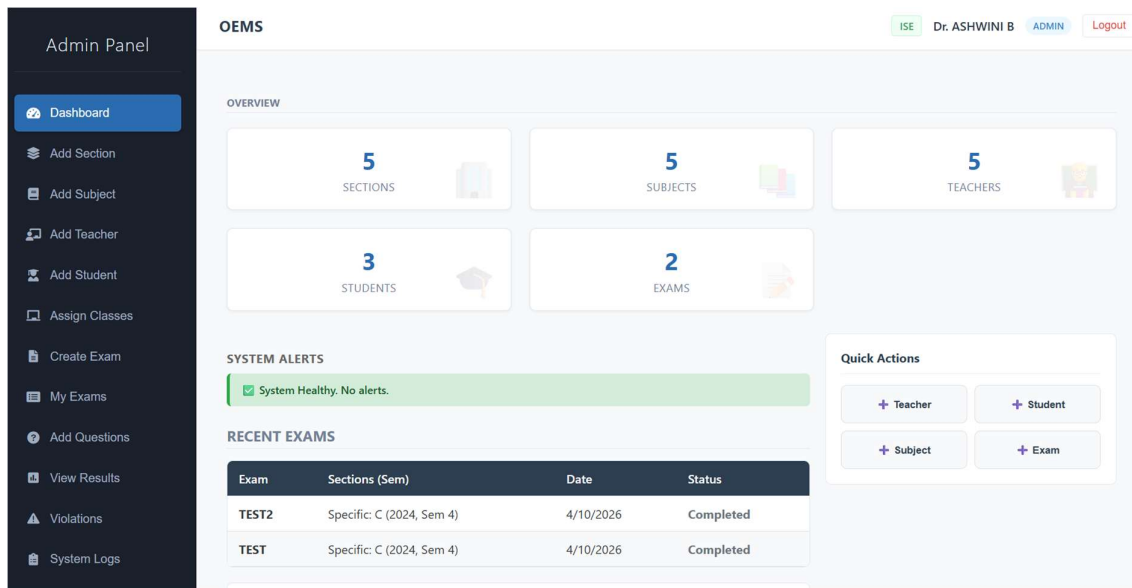
## b) Admin Dashboard

The Admin dashboard is responsible for departmental and academic management.

Key functionalities include:

- Managing teachers and students
- Creating subjects and sections
- Assigning teachers to subjects and sections
- Managing and monitoring exams within the department
- Viewing results and reports

Admins ensure smooth coordination between academic resources and exam processes.



**Fig 2.7.3 b): Admin Dashboard**

## c) Teacher Dashboard

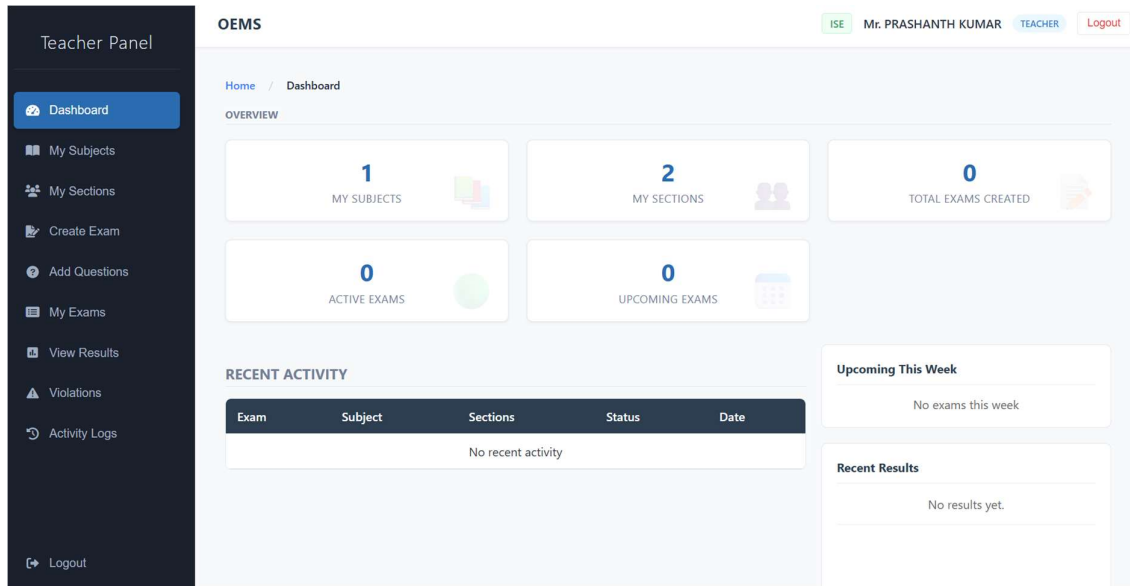
The Teacher dashboard focuses on exam creation, monitoring, and evaluation.

Key functionalities include:

- Creating and scheduling exams

- Adding and managing questions
- Monitoring live exam sessions
- Reviewing violations and proctoring evidence
- Viewing analytics and exporting results

This dashboard supports the complete examination lifecycle from creation to evaluation.



**Fig 2.7.3 c): Teacher Dashboard**

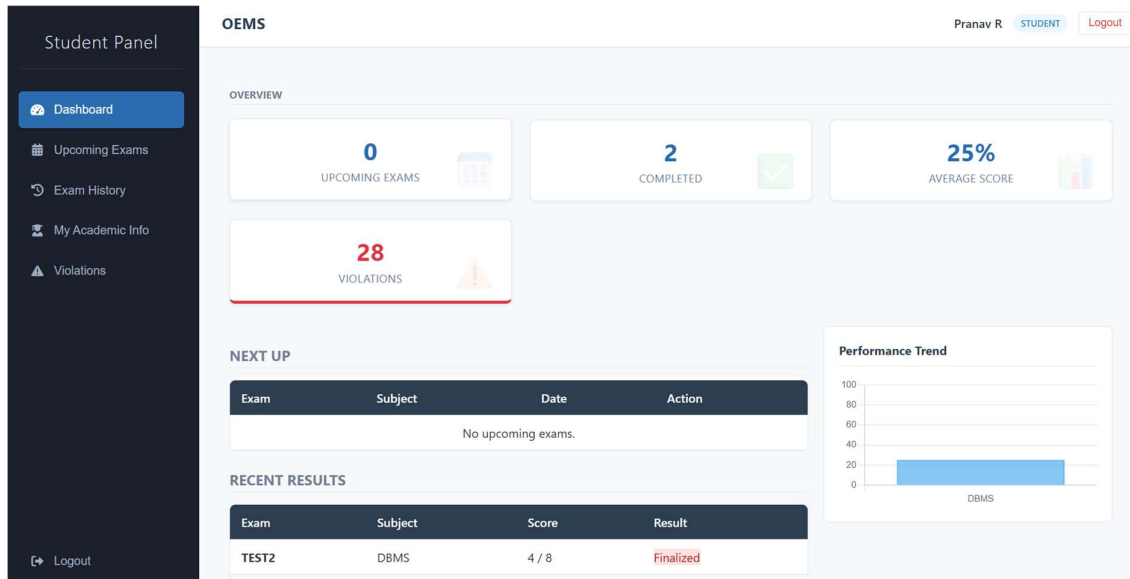
#### **d) Student Dashboard**

The Student dashboard provides access to exam-related activities and personal performance.

Key functionalities include:

- Viewing upcoming and completed exams
- Starting and attempting exams
- Accessing venue details for center-based exams
- Viewing results and performance history

The interface is designed to be simple and user-friendly to ensure a smooth exam experience.



**Fig 2.7.3 d): Student Dashboard**

## **2.7.4 Exam Interface**

The Exam Interface is the core component of the Online Examination Management System (OEMS), where students actively attempt examinations in a controlled and monitored environment.

This interface is designed to provide a seamless and distraction-free experience while ensuring strict examination integrity.

### **Key Features**

- **Question Display:**  
Questions are presented in a structured format with multiple-choice options. Students can navigate between questions using a question palette.
- **Timer Management:**  
A countdown timer is displayed, indicating the remaining time for the exam. The system automatically submits the exam when time expires.

- **Answer Tracking:**  
The interface keeps track of answered, unanswered, and marked-for-review questions.
- **Navigation Controls:**  
Students can move between questions and review their responses before final submission.

### **Proctoring Integration**

The Exam Interface is integrated with a real-time proctoring system to maintain exam integrity.

It includes:

- **Webcam monitoring** for online exams
- **Screen sharing** for center-based exams
- **Tab switch and focus detection**
- **Live violation detection and reporting**

Any suspicious activity is recorded and sent to the backend for further analysis.

### **Submission Process**

- Students can submit the exam manually using the submit button
- The system also performs **auto-submission** when time expires
- All responses are securely transmitted to the backend for evaluation

### **2.7.5 Exam Creation – (Question Builder)**

The Exam Creation module allows Teachers and Admins to design and configure examinations through an interactive Question Builder interface. This component is essential for defining the structure, content, and evaluation criteria of an exam.

### **Key Functionalities**

- **Exam Configuration:**  
Users can define exam details such as exam name, subject, date, duration, total marks, and exam mode (ONLINE or CENTER).
- **Question Management:**  
The interface allows adding multiple-choice questions (MCQs) with customizable options. Each question includes:
  - Question text
  - Multiple answer options
  - Correct answer selection
  - Marks allocation
- **Dynamic Question Builder:**  
Questions can be added, edited, or removed dynamically using an intuitive interface.
- **Validation Mechanism:**  
The system ensures that:
  - Total marks match the sum of all question marks
  - Required fields are filled before publishing
- **Exam Publishing:**  
Once all questions are added and validated, the exam can be published and made available to students.

### **System Integration**

- All questions and exam details are stored in the database
- The backend validates constraints before saving
- Published exams become visible in student dashboards

The screenshot displays the 'Create Exam' interface in the OEMS Admin Panel. The left sidebar contains navigation options like Dashboard, Add Section, Add Subject, Add Teacher, Add Student, Assign Classes, Create Exam (highlighted), My Exams, Add Questions, View Results, Violations, and System Logs. The main content area shows a form with the following fields: Exam Name (MSE1), Subject (DBMS), Date & Time (04/23/2026 01:00 PM), Duration (60), Total Marks (60), Scope (Specific Section), Section (C (2024, Sem 4)), Exam Mode (Center-Based Exam (Lab Hosted)), Center Details (Academic Block: APJ, Floor: Floor 5, Assigned Lab: LAB 01), and Exam Access Password (exam123). A 'Create Exam' button is located at the bottom of the form.

**Fig: 2.7.5: Exam Creation**

## **2.7.6 Proctoring and Monitoring**

The Proctoring and Monitoring module is a critical component of the Online Examination Management System (OEMS), designed to ensure the integrity and fairness of examinations. It continuously monitors student activity during an exam and detects suspicious behavior in real time.

### **Key Functionalities**

- **Webcam Monitoring (Online Mode):**  
The system captures live webcam input and analyzes frames to verify student presence and detect anomalies such as multiple persons or absence from the screen.
- **Screen Monitoring (Center Mode):**  
For center-based exams, full-screen sharing is enforced to monitor on-screen activities and prevent unauthorized actions.
- **Tab Switching Detection:**  
The system listens for browser events such as visibility change and blur to detect when a student switches tabs or minimizes the exam window.

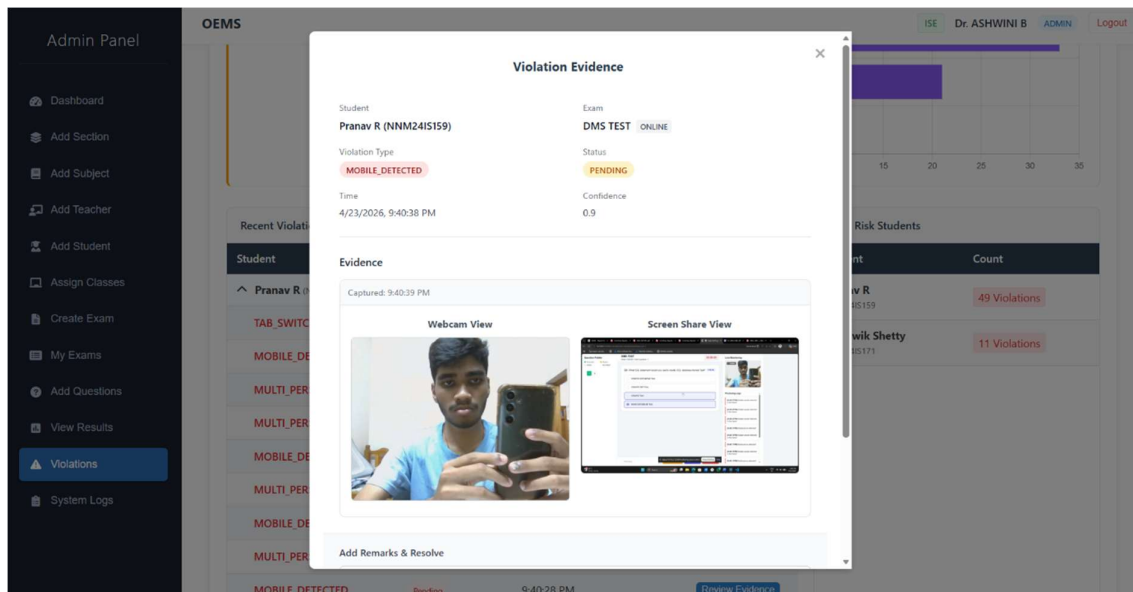
- **AI-Based Detection:**

A computer vision model (YOLOv8) is used to identify suspicious activities such as:

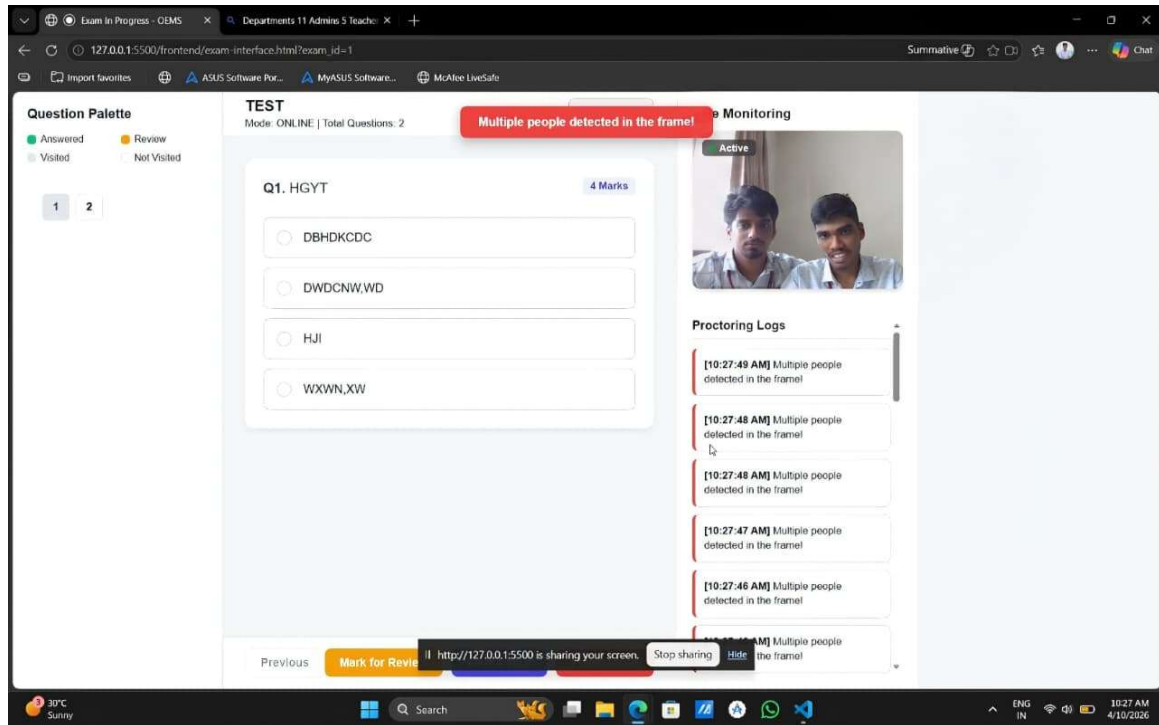
- Presence of multiple individuals
- Usage of mobile devices
- Absence of the candidate

- **Idle Detection:**

The system monitors inactivity and flags prolonged idle behavior during the exam.



**Fig 2.7.6 a) Mobile Phone detected**



**Fig: 2.7.6 b) Multi Person Detection**

## **2.7.7 Results and Analytics**

The Results and Analytics module provides detailed insights into student performance and examination outcomes. It enables Teachers and Admins to evaluate results efficiently and make data-driven decisions.

### **Key Functionalities**

- **Automatic Result Generation:**  
After exam submission, the system automatically evaluates student responses by comparing selected answers with correct options. Total marks and result status are calculated instantly.
- **Result Management:**  
Users can view detailed results for each exam, including:
  - Student-wise scores
  - Total marks obtained
  - Pass/Fail status

- **Performance Analytics:**

The system provides graphical representations of exam data using charts, including:

- Score distribution
- Pass/Fail ratios
- Student performance trends

- **Violation Insights:**

Analytics also include monitoring data, helping identify:

- High-risk students
- Frequency and types of violations

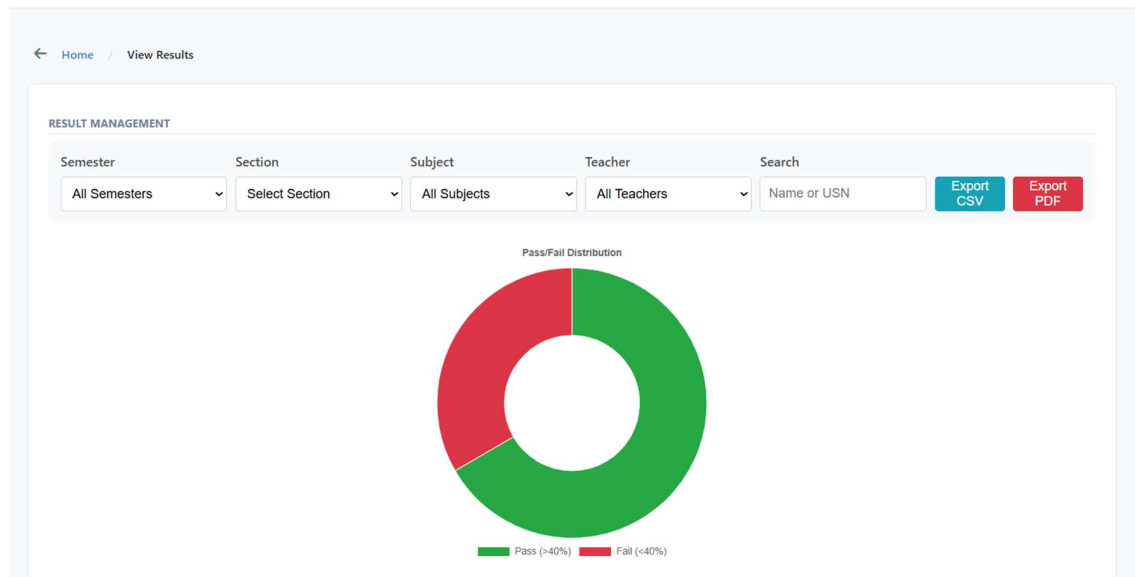
- **Export Functionality:**

Results can be exported in:

- **PDF format** for reporting
- **CSV format** for further analysis

## **System Integration**

- Evaluation logic is handled by the backend
- Results are stored in the database and fetched dynamically
- Charts are rendered on the frontend using Chart.js
- Export features are generated client-side using jsPDF



**Fig: 2.7.7: Result Analysis**

### **2.7.8 System Logs and Activity Tracking**

The System Logs and Activity Tracking module maintains a comprehensive audit trail of all critical actions performed within the Online Examination Management System (OEMS). It enhances transparency, accountability, and security by recording system-level and user-level activities.

#### **Key Functionalities**

- **Activity Logging:**

The system records important actions such as:

- User logins and logouts
- Exam creation, updates, and deletion
- Question modifications
- Violation reviews and resolutions

- **User-Based Tracking:**

Each log entry captures details including:

- User ID and role (Admin, Teacher, Student, Super Admin)

- Action performed
- Associated entity (exam, question, violation, etc.)
- Timestamp of the activity
- IP address (if available)
- **Teacher Activity Logs:**

A dedicated logging mechanism tracks teacher-specific actions such as:

  - Exam monitoring activities
  - Evaluation and result updates
  - Interaction with student records
- **Filtering and Retrieval:**

Logs can be filtered based on:

  - Date range
  - User role
  - Exam or section
  - Specific actions
- **Audit and Compliance:**

The logging system provides a reliable audit trail that can be used for:

  - Investigating system misuse
  - Verifying actions taken during exams
  - Ensuring compliance with institutional policies

### **System Integration**

- Logging is handled at the backend level using centralized logging functions
- Logs are stored in dedicated database tables
- Frontend dashboards provide interfaces to view and analyze logs

← Home / System Logs

### Global System Logs

Start Date: mm/dd/yyyy    End Date: mm/dd/yyyy    Action Type: All    Search Logs: Search action or entity...    [Export CSV](#)

Timestamp	User	Action	Entity	IP Address
4/10/2026, 10:22:36 AM	Dr. ASHWINI B <small>Admin ISE</small>	Created Exam: TEST2	exam (TEST2)	127.0.0.1
4/10/2026, 10:21:42 AM	Dr. ASHWINI B <small>Admin ISE</small>	Created Exam: TEST	exam (TEST)	127.0.0.1

Fig 2.7.8: System Logs

### **3. Conclusion**

The Online Examination Management System (OEMS) successfully demonstrates the design and development of a secure, scalable, and efficient platform for managing the complete examination lifecycle. The system fulfills its primary objectives by enabling structured exam creation, role-based access control, and seamless exam execution for multiple user roles including Super Admins, Admins, Teachers, and Students. By digitizing the examination process, the system reduces manual effort, minimizes errors, and improves overall efficiency in academic evaluation.

A key strength of OEMS is its integrated proctoring and monitoring mechanism, which enhances examination integrity through real-time surveillance and intelligent detection techniques. The system effectively identifies suspicious activities such as tab switching, multiple person presence, and unauthorized device usage, thereby ensuring a fair examination environment. Additionally, the use of FastAPI for backend development and MySQL for data management demonstrates the practical implementation of modern web technologies and database design principles, ensuring performance, reliability, and data consistency.

Furthermore, the system provides automated evaluation, result generation, and analytical insights, enabling educators to make informed decisions based on student performance data. The modular design of the system ensures maintainability and allows for future enhancements such as advanced analytics, improved security measures, and support for additional question types. Overall, OEMS offers a comprehensive and reliable solution for conducting secure digital examinations, making it highly suitable for academic institutions seeking efficient and scalable assessment systems.

## 4. References

- FastAPI Documentation. Sebastián Ramírez. Available at: <https://fastapi.tiangolo.com/>
- MySQL Documentation. Oracle Corporation. Available at: <https://dev.mysql.com/doc/>
- Pydantic Documentation. Available at: <https://docs.pydantic.dev/>
- Passlib Documentation. Available at: <https://passlib.readthedocs.io/>
- Chart.js Documentation. Available at: <https://www.chartjs.org/docs/>
- jsPDF Documentation. Available at: <https://github.com/parallax/jsPDF>
- Supabase Storage Documentation. Available at: <https://supabase.com/docs/guides/storage>
- Ultralytics YOLOv8 Documentation. Available at: <https://docs.ultralytics.com/>
- Ramez Elmasri and Shamkant B. Navathe. *Fundamentals of Database Systems*, 7th Edition. Pearson Education, 2015.
- C.J. Date. *An Introduction to Database Systems*, 8th Edition. Addison-Wesley, 2003.