# **Functionality of Project**

# **EduNexa AI-Integrated Learning Management System (LMS)**

## **1. Tech Stack**

**Frontend:** React + Vite (Fast, modern UI) **Backend:** Flask (Python APIs) **Database:** MongoDB (NoSQL for flexible schema) **AI Integration:** NLP + Summarization + Quiz Generation (Gemini)

## **2. Core LMS Modules**

### **2.1 Authentication & User Roles**

**Users:**

* Student
* Teacher
* Admin

### **2.2 Login & Signup Forms**

#### **Student Signup**

* Full Name
* Email ID (Unique)
* Phone Number
* Password (Encrypted)
* Enrollment Number / Roll Number
* Department / Course (Dropdown)
* Year / Semester
* Profile Picture (Optional)

#### **Teacher Signup**

* Full Name
* Email ID (Unique)
* Phone Number
* Password (Encrypted)
* Employee ID / Faculty ID
* Department
* Designation (Assistant Prof., Lecturer, etc.)
* Profile Picture (Optional)

#### **Admin Signup (Controlled by system)**

* Admin Name
* Email
* Password

## **3. Dashboards**

### **3.1 Student Dashboard**

* Enrolled Courses List
* Course Progress (with percentage bar)
* Upcoming Assignments & Deadlines
* Quizzes & Results
* Personalized Learning Path (AI Suggested)
* Interest-Based Course Suggestions
* Chatbot Widget (AI Assistance)

### **3.2 Teacher Dashboard**

* Courses created by them
* Uploaded study materials (PPTs, PDFs, Videos)
* Student submissions (Assignments & Quizzes)
* Student performance analytics (class-level + individual)
* AI Suggestions → where students are struggling most
* Option to auto-generate quiz from course content

### **3.3 Admin Dashboard**

* Manage Users (Add/Remove Students, Teachers)
* Manage Courses (Approve/Remove)
* System Analytics (Active users, course popularity)
* Performance Trends (Overall institution level)
* AI Dashboard:
  + Reports on most asked student queries
  + Student learning behavior insights

## **4. Course Management Module**

**Course Creation (Teacher/Admin):**

* Title, Description, Category
* Upload Materials (PDF, PPT, Docs, Videos)
* Assignments Upload
* Quiz Creation (manual or AI auto-generated)

**Course Enrollment (Student):**

* Browse Courses
* Search & Filter
* Enroll/Unenroll

## **5. Assignments & Quiz Management**

**Assignments:**

* Teacher uploads assignment (PDF/DOC format)
* Student submits work (Upload file/text)
* Teacher reviews and grades

**Quizzes:**

* MCQ, True/False, Short Answer
* Auto-Grading (for objective questions)
* Result Analytics (Average, Highest, Weak areas)

**AI Feature:** Generate quizzes automatically from uploaded lecture/PDF content

## **6. Tracking Student Progress**

* Courses completed %
* Quiz scores
* Assignment submissions
* AI-based feedback (areas of improvement)

## **7. AI Chatbot Features**

* **Text Summarization:** Summarize long PDF/Notes/Videos into short notes.
* **Q&A:** Student asks natural language questions → chatbot answers from course materials.
* **Quiz Generation:** Create MCQs automatically from notes/PDFs.
* **Learning Assistance:** Explain difficult topics in simple words.
* **Personalized Recommendations:** Suggest new courses, study material, or remedial content.

## **8. Advanced Features**

* **Personalized Learning Path**: AI suggests what to study next based on student scores & weak topics.
* **Interest-Based Course Suggestions**: Recommended courses based on enrolled subjects.
* **Analytics for Teachers & Admins**:
  + Which topics are most confusing?
  + Student engagement time in videos/materials.
  + Student leaderboard & comparison.

## **9. Gamification & Engagement Features**

* **Achievement Badges**: Digital badges for completing courses, milestones, and special achievements
* **Certificates**: Automated certificate generation upon successful course completion
* **Leaderboards**: Display top-performing students to encourage healthy competition
* **Point Systems**: Award points for various activities (completing lessons, assignments, participation)

## **10. Integration & Export Features**

* **Calendar Integration**: Sync with Google Calendar and Outlook for deadlines, events, and class schedules
* **Grade Export**: Export grades and transcripts to Student Information Systems (SIS)
* **Data Export**: Export data in multiple formats (CSV, Excel, PDF reports) for analysis and record-keeping

## **11. User Management & Administration**

* **Bulk User Import/Export**: Mass upload/download of users via CSV files for efficient administration
* **Custom User Roles**: Create custom roles beyond basic Student/Teacher/Admin (e.g., Teaching Assistant, Course Coordinator, Department Head)
* **Automated Report Generation**: Generate automated reports for attendance, performance, and engagement metrics

## **12. Reporting & Analytics**

* **Performance Reports**: Detailed analytics on student and course performance
* **Attendance Tracking**: Monitor and report student participation and engagement
* **Engagement Metrics**: Track user activity, time spent on platform, and learning patterns

## **13. Database Schema (MongoDB Draft)**

### **Users Collection**

{

"user\_id": "U123",

"role": "student/teacher/admin",

"name": "Yogesh Chauhan",

"email": "yc@gmail.com",

"password": "hashed\_password",

"phone": "9876543210",

"roll\_no": "MCA2025\_001",

"department": "Data Science",

"year": "Final",

"profile\_pic": "url"

}

### **Courses Collection**

{

"course\_id": "C101",

"title": "Machine Learning",

"description": "Intro to ML",

"teacher\_id": "T201",

"materials": ["ml\_notes.pdf", "ml\_video.mp4"],

"assignments": ["A1", "A2"],

"quizzes": ["Q1", "Q2"]

}

### **Assignments Collection**

{

"assignment\_id": "A1",

"course\_id": "C101",

"title": "Linear Regression Assignment",

"deadline": "2025-10-05",

"submissions": [

{"student\_id": "S301", "file": "sub1.pdf", "grade": "A"}

]

}

### **Quizzes Collection**

{

"quiz\_id": "Q1",

"course\_id": "C101",

"questions": [

{"q": "What is regression?", "type": "MCQ", "options": ["a","b","c"], "answer": "a"}

],

"results": [

{"student\_id": "S301", "score": 8}

]

}

## **Test Login Credentials**

### **Students (for testing)**

**1. Student Account**

* Email: student01@datams.edu
* Password: Stud@2025
* Name: Ravi Kumar
* Roll No: MCA2025\_001

**2. Student Account**

* Email: student02@datams.edu
* Password: Stud@2025
* Name: Priya Sharma
* Roll No: MCA2025\_002

**3. Student Account**

* Email: student03@datams.edu
* Password: Stud@2025
* Name: Aman Verma
* Roll No: MCA2025\_003

### **Teachers (for testing)**

**1. Teacher Account**

* Email: teacher01@datams.edu
* Password: Teach@2025
* Name: Dr. Seema Singh
* Faculty ID: FAC1001

**2. Teacher Account**

* Email: teacher02@datams.edu
* Password: Teach@2025
* Name: Prof. Anil Mehta
* Faculty ID: FAC1002

### **Admins (for testing)**

**1. Admin Account**

* Email: admin@datams.edu
* Password: Admin@2025
* Name: System Admin

**2. Super Admin Account**

* Email: superadmin@datams.edu
* Password: Super@2025
* Name: Super Admin

## **Theme Support (Light & Dark Mode)**

### **1. Feature Overview**

* The application will have both Light Mode (default) and Dark Mode available.
* Users can select their preferred theme through a toggle switch.
* The theme choice will be saved in localStorage so that the same theme is applied during the user's next login.

### **2. Requirements**

* Frontend: React + Vite
* UI Styling: Tailwind CSS (with dark: modifier)
* Persistence: LocalStorage or MongoDB (if profile-level preference required)

### **3. Theme Options**

**Light Theme**

* Background: White / Light Gray
* Text: Black / Dark Gray
* Cards / Dashboard Panels: Soft shadows + light borders

**Dark Theme**

* Background: Dark Gray / Black
* Text: White / Light Gray
* Cards / Dashboard Panels: Softer contrast with glowing highlights

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