**Course Review Platform with AI**

**Business Requirement Document**

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**1.1 INTRODUCTION**

The Course Review Platform with AI is a web-based solution designed to improve the academic decision-making process by enabling students to share feedback about courses and receive personalized course recommendations powered by artificial intelligence. The system brings together students, instructors, and administrators into a centralized platform for course evaluation and discovery.

**1.1 Objective**

* To build a full-stack web application that allows students to review and rate courses.
* To implement intelligent algorithms that recommend courses based on user interests and sentiments.
* To provide analytics and insights to help academic institutions improve course quality.

**1.2 Problem Identification**

Students often face difficulty in selecting suitable courses due to a lack of centralized, peer-based feedback and guidance. Current systems either do not exist or do not offer intelligent recommendations or sentiment-based insights, which limits informed decision-making. Institutions also lack tools to analyze course effectiveness and reception.

**1.3 Solution**

To address the challenges students face in selecting the right academic courses due to the lack of centralized and intelligent feedback systems, the proposed solution is a full-stack web application called the Course Review Platform with AI. This platform enables students to review and rate courses, share feedback, and explore detailed course information through a user-friendly interface. The system incorporates advanced AI features such as sentiment analysis of written reviews to understand student sentiments, and a personalized recommendation engine that suggests relevant courses based on users’ preferences, past reviews, and content similarity. Administrators benefit from an analytics dashboard that provides visual insights into course performance and trends, allowing institutions to make data-driven improvements.

**2. BUSINESS REQUIREMENTS**

**2.1 Business goals and objectives**

* Deliver an intuitive course review and recommendation platform.
* Enhance the student experience with intelligent, data-driven suggestions.
* Support administrators in tracking and improving course quality.

**2.2 Stakeholders**

* The End Users of the platform are students and administrators who will interact with the system by submitting course reviews, browsing recommendations, and analyzing feedback through the dashboard.
* The Evaluators, such as mentors and judges, are responsible for reviewing the final deliverables, assessing the implementation quality, and ensuring that the solution meets the outlined objectives and technical standards.

**2.3 Requirements scope**

**In Scope**

* Users can sign up, log in securely using JWT, and manage academic preferences in their profiles.
* Courses can be added (admin), listed for browsing, and filtered by department, difficulty, or instructor.
* Students can post and edit reviews, which are analyzed for sentiment to understand feedback tone.
* The system uses user behavior and course metadata to suggest personalized course options.
* Students see personalized recommendations; admins get analytical views of course ratings and trends.

**Out Scope**

* The platform does not include detailed insights or evaluations for individual instructors.
* The current project focuses only on the web version and does not include mobile app development.
* Monetization features such as course payments, premium plans, or subscriptions are not included.

**3. FUNCTIONAL REQUIREMENTS**

**3.1 Detailed Features**

* **JWT-based authentication (Login/Signup):** Users will register and log in using a secure JWT-based authentication system to ensure session integrity.
* **Role-based access: Student, Instructor, Admin:** Each user role will have specific access permissions. Students can review and view courses, instructors can manage course content, and admins oversee the entire system.
* **Add, browse, and filter courses:** Courses can be added by authorized users and browsed by students with filtering options such as department, instructor, and difficulty level.
* **Post/edit/delete course reviews:** Students can submit reviews with ratings and comments, and they will also have the ability to edit or delete their reviews.
* **Sentiment analysis of review text:** Reviews submitted by students will be processed using NLP models to extract sentiment (positive, negative, or neutral).
* **Course recommendation engine:** The system recommends courses to students based on:
  + Student interests collected during signup or profile updates.
  + Review history that captures their preferences and engagement.
  + Course similarity using content-based filtering and metadata.

**3.2. System Workflows**

**3.3. Technology Stack**

#### **Frontend**

* **React + Vite**: Used for building fast, modular, and scalable UI components with modern hooks.
* **Tailwind CSS & Chakra UI:** Styling framework and UI component library for responsive design.
* **Redux Toolkit:** For managing global application state and user sessions.

#### **Backend**

* **Node.js + Express:** Provides a scalable and lightweight server-side application framework.
* **RESTful APIs:** Backend communication follows REST principles for structured data flow.
* **MongoDB (via Mongoose):** Stores all users, courses, and reviews using a flexible NoSQL schema.
* **JWT:** Used for secure authentication and access control.

#### **AI Integration**

* **Sentiment Analysis using NLP:** AI models (e.g., HuggingFace) analyze reviews to extract emotional tone.
* **Collaborative Filtering:** Suggests courses based on preferences and similarities with other users.
* **Content-based Filtering:** Recommends courses using tags, descriptions, and review content similarity.

**4. NON-FUNCTIONAL REQUIREMENTS**

**Performance**

API responses should complete within 2 seconds; UI components should load under 1 second for smooth navigation.

**Security**

All user data and sessions must be secured using JWT tokens and encrypted connections (HTTPS); role-based access must prevent unauthorized actions.

**Usability**

The UI should be clean, accessible, and responsive across all modern browsers and devices (mobile/tablet/desktop).

**Maintainability**

Code should be modular, well-documented, and follow best practices for easy updates and enhancements.

**Availability**

| The platform should maintain at least 99.9% uptime when deployed in production using cloud infrastructure. |
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**5. DATA REQUIREMENTS**

The system will handle various types of data to enable core functionalities such as user management, course listings, review submissions, and AI-based recommendations. All data must be securely stored, validated, and retrievable through the platform’s backend services.

### **User Data**

The platform will store user-related information such as names, email addresses, login credentials, academic preferences, and user roles (e.g., student, instructor, admin). This data is essential for authentication, personalization, and role-based access control.

### **Course Data**

Each course will have associated data including its title, department, instructor name, description, prerequisites, and categorization tags. This allows users to browse, filter, and view relevant course information.

### **Review Data**

Students will submit reviews that include numeric ratings and written feedback. Each review will also carry a timestamp and will be processed through sentiment analysis to extract opinions and classify them as positive, neutral, or negative.

### **Recommendation Data**

To power AI features, the system will analyze user preferences, review history, and course similarities. This data will be used internally to generate personalized course suggestions for each student.

### **Analytics Data**

Aggregated data such as average course ratings, review trends, and user engagement metrics will be stored and visualized in the admin dashboard for institutional insights.

**6. COST-BENEFIT ANALYSIS**

| **Category** | **Estimated Cost (Effort/Resources)** | **Benefit** |
| --- | --- | --- |
| **Development Time** | ~3 days | A fully deployable, full-stack AI-integrated project for portfolio and evaluation. |
| **Hosting** | Paid (AWS) | Enables live demo access for reviewers and users. |
| **AI Integration** | Free tier (OpenAI/HuggingFace) | Enhances user experience with intelligent suggestions and sentiment insights. |
| **Overall ROI** | High | Demonstrates cross-functional expertise in frontend, backend, and AI. Valuable for job roles, hackathons, or academic credit. |