

Mentora

Project Proposal

**Course Instructor:**

Mr. Usman Anwar

**Group Members:**

Mah Rukh 22L-6702

National University of Computer and Emerging Sciences

Department of Computer Science

Lahore, Pakistan

# Abstract

Mentora is a mobile and web application designed to deliver an adaptive learning experience similar to a scaled-down version of Coursera. The app uses rule-based techniques to adjust learning modules based on the student's pace. Upon completion of each module, Mentora recommends subsequent courses tailored to individual progress. While the initial release will not incorporate machine learning due to current dataset limitations, the architecture is designed to seamlessly integrate ML-based personalization in future iterations. This project aims to enhance student learning outcomes by offering a personalized and intuitive platform for managing educational content.

# Introduction

Mentora is developed to address the diverse needs of modern learners by providing a flexible, adaptive learning platform. The application will allow students to register, browse courses, and receive personalized module recommendations based on their performance. By using rule-based adaptive techniques, the system can suggest remedial content to students who take longer on certain topics or advanced material to those who progress quickly. This solution bridges the gap between static course content and the dynamic needs of students, offering a structured yet personalized learning journey.

# Goals and Objectives

The primary objectives of the Mentora project are as follows:

1. **Develop a Mobile Application:**

* Create an intuitive and user-friendly mobile interface optimized for Android devices.

1. **Implement Adaptive Learning Techniques:**

* Utilize rule-based logic to adjust module difficulty based on the student's pace and performance.
* Automatically recommend subsequent courses upon module completion.

1. **Integrate Core E-Learning Features:**

* Provide secure user registration and profile management.
* Enable course browsing, enrollment, and progress tracking.

1. **Future-Proof Architecture:**

* Design the system to facilitate future integration of machine learning components.
* Consider potential expansion to a web application as an enhancement.

1. **Enhance Student Engagement:**

* Deliver personalized learning paths and performance analytics to motivate and guide students.

# Scope of the Project

The scope of the Mentora project includes:

1. **Development Focus:**
   * Primary focus on developing a mobile application for Android devices.
   * Backend development to manage user data, course content, and adaptive logic.
2. **Feature Implementation:**
   * Implementation of core e-learning functionalities (user management, course catalog, module-based learning).
   * Integration of the rule-based adaptive learning engine and course recommendation system**.**
3. **Reference Implementation:**
   * The design and functionality are inspired by popular educational apps like Coursera: Online Courses on the Google Play Store.
4. **Future Enhancements:**
   * Planned integration of machine learning techniques to further refine personalization.
   * Possibility of expanding to a web application in future phases.

# List of Features to be Implemented

1. **User Registration & Profile Management:**
   * Secure sign-up/login and personalized student profiles.
2. **Course Catalog & Enrolment:**
   * Browse and enroll in a range of courses segmented by subject.
3. **Module-Based Learning Structure:**
   * Courses divided into modules with interactive content and quizzes.
4. **Rule-Based Adaptive Learning Engine:**
   * Adjust module difficulty based on real-time performance and pacing.
   * Provide immediate feedback and dynamic recommendations upon module completion.
5. **Automated Course Recommendation:**
   * Suggest “next-step” courses tailored to the student’s progress.
6. **Progress Tracking & Analytics Dashboard:**
   * Visual indicators of progress, module completion, and performance metrics.
7. **Future AI Integration Hooks:**
   * Modular design enabling the later addition of machine learning for personalized recommendations.
8. **Mobile-Optimized UI:**
   * A sleek and responsive interface designed specifically for mobile usage.

# Unique Features

1. **Adaptive Learning Engine:**
   * Unlike static educational apps, Mentora uses a rule-based system to personalize the learning experience in real time.
2. **Personalized Course Pathways:**
   * Offers unique course recommendations that adjust dynamically to each student’s learning pace and performance.
3. **Mobile-First Design:**
   * Optimized exclusively for mobile use, ensuring accessibility and ease-of-use for students on the go.
4. **Future-Proof Architecture:**
   * Built with an eye toward future AI integration and potential web application expansion, ensuring scalability and longevity.
5. **User-Centric Analytics:**
   * Provides actionable insights into individual learning progress, helping students manage their study habits effectively

# Initial Study and Work Done so Far

Preliminary research has involved a detailed review of existing e-learning applications, particularly the **Coursera: Online Courses** app available on the Google Play Store. This review helped identify the best practices for user interface design, course navigation, and personalized recommendations. Initial design sketches and system architecture drafts have been prepared, outlining the flow of user interaction and adaptive module recommendations. These early efforts have validated the potential impact of adaptive learning on student engagement and academic performance.

# References

1. Coursera: Online Courses. Available on Google Play Store: <https://play.google.com/store/apps/details?id=org.coursera.android>
2. Additional literature on adaptive learning and user interface design (to be expanded as the project progresses).