PROJECT SYNOPSIS REPORT

ON

SkillHub (Learning Management System)

SUBMITTED

TO

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

FOR

Back End Engineering(22CS026)

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PROBLEM STATEMENT

A Learning Management System (LMS) is needed to address the inefficiencies and limitations of traditional learning methods, particularly in managing and delivering educational content, tracking student progress, and facilitating communication between students and instructors. In many institutions, there is a lack of a centralized, user-friendly platform that allows for easy access to course materials, submission of assignments, online assessments, and performance monitoring. This project aims to develop an LMS that provides a scalable, accessible, and secure solution to enhance the overall learning experience and streamline administrative tasks for both learners and educators.

TITLE OF PROJECT

To develop a comprehensive SkillHub.

OBJECTIVE & KEY LEARNINGS

 Backend Development:

* User Authentication & Authorization: Implement secure registration and login functionality. Integrate **OTP verification** (via email or SMS) during signup, login, or password reset using services.
* Role-Based Access Control (RBAC): Define roles such as **Admin**, **Instructor**, and **Student**. Restrict access to routes and features based on user roles.
* Database Design: Design relational or NoSQL schemas (depending on stack) to store users, course content, assessments, and user progress. Implement indexes and relationships for efficient data access.

 Front-end Development:

* User Interface (UI) Design: Develop skills in creating responsive, attractive, and user-friendly interfaces using modern front-end frameworks.
* User Experience (UX) Optimization: Focus on providing a seamless and intuitive user experience, including fast load times and easy navigation.

 Scalability and Performance:

* Load Balancing and Caching: Understand techniques to ensure the website can handle increasing numbers of users and transactions efficiently.
* Performance Optimization: Optimize server responses and database queries to improve website performance.

 Deployment and Maintenance:

* Continuous Integration/Continuous Deployment (CI/CD): Gain knowledge in setting up CI/CD pipelines for automated testing and deployment, ensuring smooth updates.
* Monitoring and Analytics: Implement tools to monitor website performance, track user behavior, and use analytics to drive improvements.

OPTIONS AVAILABLE TO EXECUTE THE PROJECT

* Developing a custom hospital management system from scratch.
* Utilizing existing hospital management software and customizing it to meet specific needs.
* Exploring open-source solutions for hospital management.
* Building a custom hospital management system from scratch offers the opportunity to tailor the solution to the hospital's specific needs, ensuring maximum flexibility and seamless integration with existing systems.
* Utilizing and customizing existing hospital management software to meet specific needs can significantly reduce development time and costs, leveraging the features and functionalities already available in the software.
* Exploring open-source solutions for hospital management provides access to a wide range of pre-built modules and components, potentially reducing development time and costs. However, it may require extensive customization to align with the hospital's unique requirements and workflows.
* Evaluating cloud-based hospital management solutions could be beneficial in terms of scalability, accessibility, and maintenance, offering the potential for rapid deployment and reduced infrastructure concerns.
* Partnering with established healthcare technology providers for a turnkey solution might be viable, offering comprehensive support, training, and ongoing maintenance, albeit potentially at a higher cost.

ADVANTAGES

**Enhanced Security**

* OTP-based authentication adds an extra layer of protection against unauthorized access, ensuring that only verified users can access sensitive learning data.

**Centralized Learning Platform**

* Brings all learning materials, assessments, and progress tracking into one platform, improving organization and accessibility for students and instructors.

**Role-Based Access Control**

* Ensures users (admins, instructors, students) only see and interact with the features relevant to their roles, making the system efficient and user-friendly.

**Improved Communication**

* Enables timely notifications, updates, and reminders via email or SMS, enhancing communication between students and instructors.

**Scalability & Flexibility**

* Can accommodate a growing number of users and courses, making it suitable for institutions of all sizes and adaptable for future expansion.

**Remote Learning Support**

* Facilitates learning from anywhere, at any time—ideal for online or hybrid education models.

DISADVANTAGES

**Initial Development & Setup Cost**

* Building a secure, feature-rich LMS requires time, technical expertise, and resources, which can be costly during the initial phase.

**Technical Dependency**

* Users must have stable internet access and basic digital literacy to navigate the platform effectively, which may not be feasible for all learners.

**OTP Delivery Issues**

* OTPs sent via email or SMS can be delayed or not delivered due to network issues or spam filters, leading to user frustration and access problems.

**Maintenance & Updates**

* The system needs continuous updates, bug fixes, and security patches to stay functional and secure, which requires ongoing backend support.

# REFERENCES

1. Documentation:
   * React
   * Node.js
   * Express
   * MongoDB
2. Online courses and tutorials:
   * Udemy, Coursera, FreeCodeCamp: Comprehensive courses on full-stack development
   * YouTube: Free tutorials and walkthroughs.
3. Books:
   * "Learning React" by Alex Banks and Eve Porcello: For React.js.
   * "Node.js Design Patterns" by Mario Casciaro: For Node.js and Express