Full Stack Development with MERN
Project Documentation

1. Introduction

Project Title: Learn Hub : Your Center for Skill Enhancement

Team Members:

• Nandyala Pranathi – Full Stack Developer (Frontend, Backend, Database Design, Testing)

2. Project Overview

Purpose:

Learn Hub is a MERN stack-based online learning platform designed to provide affordable and structured digital education. The project aims to create a scalable web application where users can register, enroll in courses, track their progress, and download certificates upon completion.

Features:

- User Registration and Login (JWT Authentication)
- Course Creation and Management
- Course Enrollment System
- Video-Based Learning Module
- Progress Tracking
- Certificate Generation using PDFKit
- Responsive User Interface

3. Architecture

Frontend:

The frontend is developed using React.js. It follows a component-based architecture where UI components are reusable and state management is handled using React hooks. Routing is managed using React Router.

Backend:

The backend is built using Node.js and Express.js. RESTful APIs handle authentication, course management, enrollment, and certificate generation. Middleware is used for authentication and error handling.

Database:

MongoDB is used as the NoSQL database. Collections include Users, Courses, and Enrollments. Mongoose is used for schema modeling and data validation.

4. Setup Instructions

Prerequisites:

- Node.js (v16 or above)
- MongoDB
- Git

Installation:

1. Clone the repository: git clone <repository-url>
2. Navigate to project directory.
3. Install backend dependencies: cd server && npm install
4. Install frontend dependencies: cd client && npm install
5. Configure environment variables in .env file.
6. Start backend and frontend servers.

5. Folder Structure

Client:

```
client/
 ├── src/
 │   ├── components/
 │   ├── pages/
 │   ├── App.js
 │   └── index.js
```

Server:

```
server/
 ├── controllers/
 ├── models/
 ├── routes/
 ├── middleware/
 └── server.js
```

6. Running the Application

Frontend: npm start (inside client directory)

Backend: npm start (inside server directory)

7. API Documentation

POST /api/auth/register – Register new user

POST /api/auth/login – User login

GET /api/courses – Get all courses

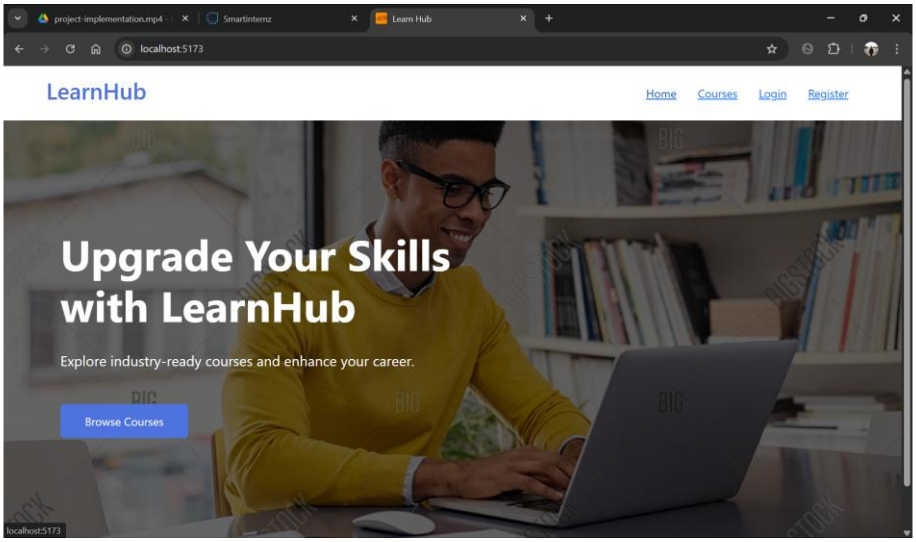
POST /api/enroll/:id – Enroll in course

GET /api/certificate/:id – Download certificate

8. Authentication

Authentication is handled using JWT (JSON Web Token). After successful login, a token is generated and stored on the client side. Protected routes verify the token before granting access.

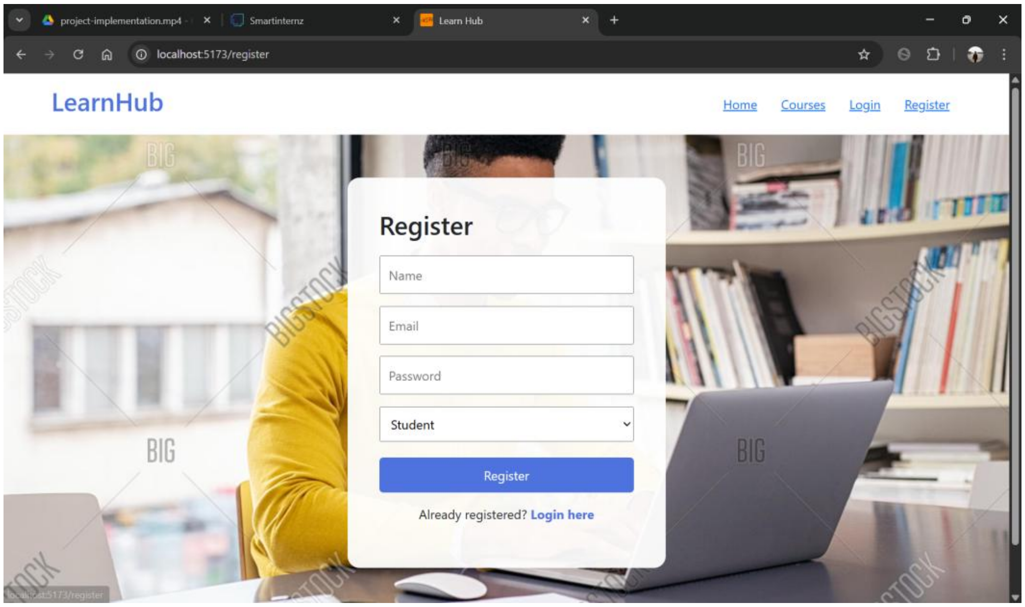
9. User Interface



Upgrade Your Skills with LearnHub

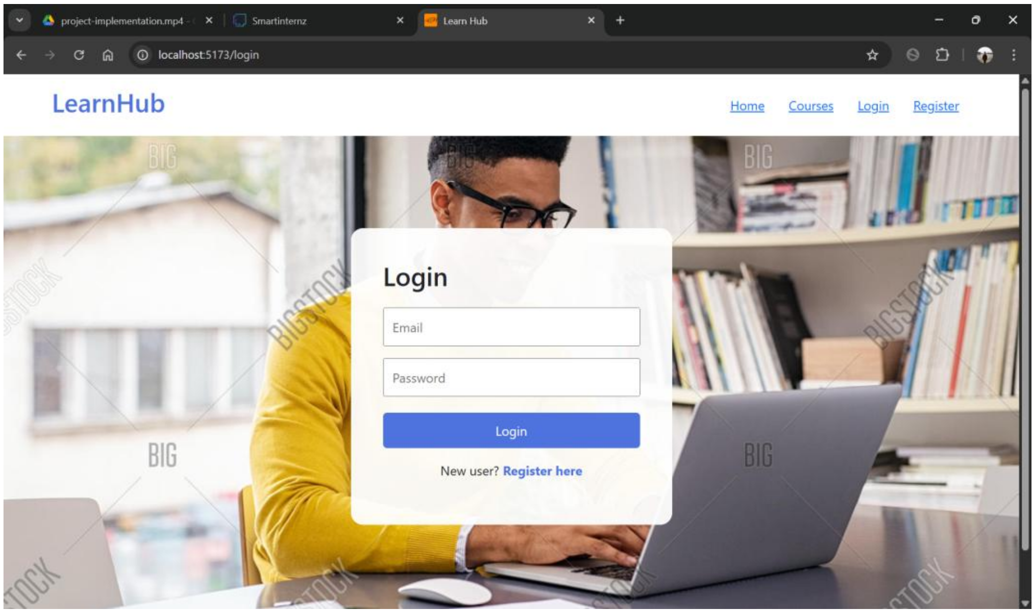
Explore industry-ready courses and enhance your career.

Fig 1: Home Page



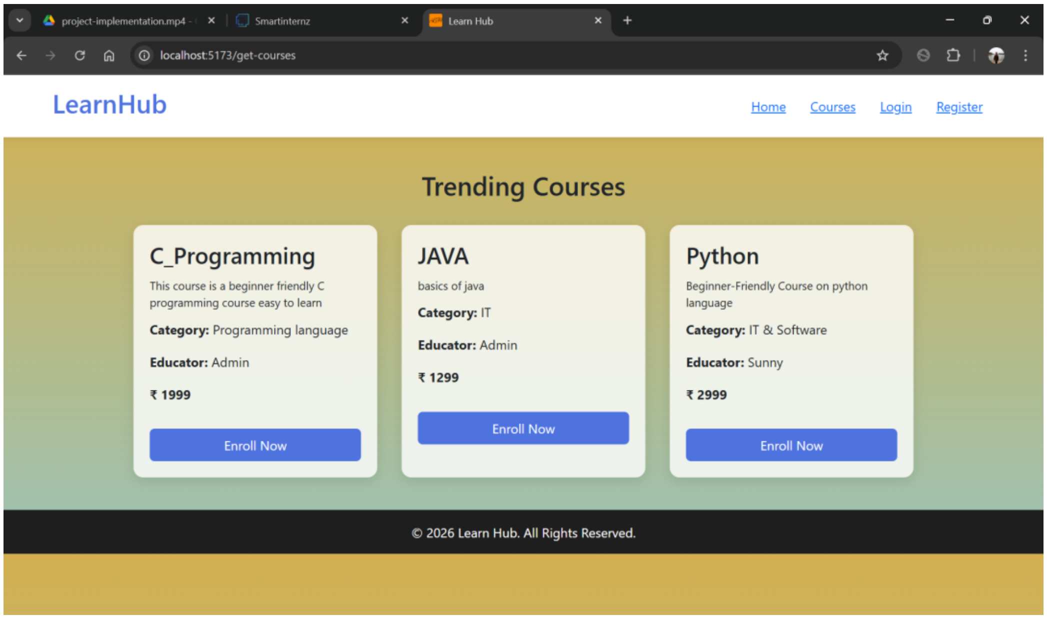
Already registered? **Login here**

Fig 2: Registration page



New user? **Register here**

Fig 3: Login page



Trending Courses

C_Programming
This course is a beginner friendly C programming course easy to learn
Category: Programming language
Educator: Admin
₹ 1999

JAVA
basics of java
Category: IT
Educator: Admin
₹ 1299

Python
Beginner-Friendly Course on python language
Category: IT & Software
Educator: Sunny
₹ 2999

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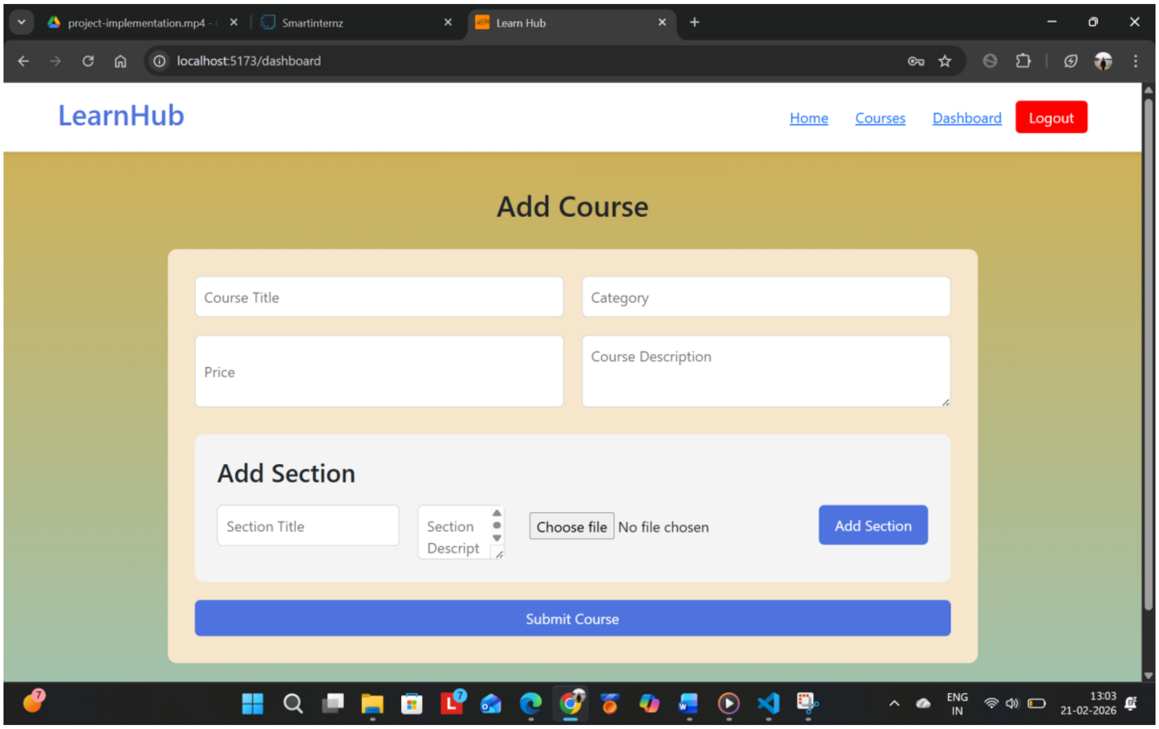
Fig 4: Course Page



Add Course

Add Section

Fig 5: Add Course Page

10. Testing

Manual testing was conducted for registration, login, enrollment, progress tracking, and certificate generation. All test cases were validated successfully.

11. Screenshots or Demo

GitHub Repository: Pranathi-collab/Learn-Hub

Project Demo Video:
https://drive.google.com/file/d/1yTByqq4RpRp6UUXlGWEZMctMLB7fDe02/view?usp=sharing

12. Known Issues

- Application requires stable internet connection.

- No live interaction or chat functionality implemented.

13. Future Enhancements

- Mobile application support.

- AI-based course recommendations.

- Live classes and discussion forums.

- Cloud deployment and scalability improvements.