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## **LOVELY PROFESSIONAL UNIVERSITY, PUNJAB**

### **INT331-CA2 PROJECT REPORT**

Topic: (Virtual classroom using git and github)

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**Submitted to:**

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## **ACKNOWLEDGEMENT**

I would like to express my sincere gratitude to all those who contributed, directly or indirectly, to the successful completion of this project titled **“Learning Management System (LMS)”**.

First and foremost, I would like to thank my project guide for their valuable guidance, continuous support, and constructive feedback throughout the development of this project. Their encouragement and technical insights played a crucial role in shaping the project and ensuring its successful completion.

I extend my heartfelt thanks to the faculty members of the department for providing the necessary resources, knowledge, and academic environment that helped me gain a deeper understanding of the subject matter and apply theoretical concepts to practical implementation.

I am also thankful to my friends and peers for their cooperation, suggestions, and motivation

during the development phase of the project. Their discussions and support helped me overcome challenges and improve the overall quality of the work.

Finally, I would like to express my sincere gratitude to my parents and family members for their constant encouragement, patience, and moral support throughout the project period. Without their motivation and understanding, the successful completion of this project would not have been possible.

# **LEARNING MANAGEMENT SYSTEM (LMS)**

## A Full Stack Web Application

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### 1. INTRODUCTION

#### 1.1 Background of Online Learning

The advancement of internet technologies and digital platforms has transformed the traditional education system. Online learning has become an essential mode of education due to its flexibility, accessibility, and cost-effectiveness. Learning Management Systems (LMS) play a crucial role in delivering educational content, managing users, tracking progress, and enabling interaction between learners and instructors.

Educational institutions, training organizations, and individuals increasingly rely on LMS platforms to conduct courses, manage assessments, and provide certifications. However, many existing platforms are either

expensive, difficult to customize, or lack modern user experience features.

---

## 1.2 What is a Learning Management System (LMS)?

A Learning Management System is a software application that allows:

- Creation and management of courses
- Enrollment of students
- Tracking learning progress
- Secure payments and subscriptions
- Role-based access for students and educators

An LMS typically consists of:

- Frontend interface for users
- Backend services for data handling
- Database for storing user and course data
- Authentication and authorization mechanisms

---

## 1.3 Purpose of the Project

The purpose of this project is to design and develop a scalable, secure, and user-friendly Learning Management System using modern full-stack technologies. The application enables students to purchase and enroll in courses, educators to create and manage content, and administrators to control platform activities.

---

## 1.4 Scope of the Project

The LMS supports:

- User authentication and authorization
  - Course creation and management
  - Secure online payments
  - Role-based dashboards
  - Responsive user interface
  - Deployment on cloud platforms
-

## 2. PROBLEM STATEMENT

Traditional classroom learning often faces limitations such as:

- Lack of accessibility for remote learners
- Fixed schedules and locations
- Limited personalization
- Manual tracking of progress and payments

Existing LMS platforms may:

- Be costly for small institutions
- Lack flexibility for customization
- Provide poor user experience
- Have complex setup processes

Problem Statement:

To design and implement a modern Learning Management System that provides secure authentication, efficient course management, seamless payment integration, and an intuitive user interface while being scalable and cost-effective.

---

### 3. OBJECTIVES

#### 3.1 Primary Objectives

- To develop a full-stack LMS using the MERN stack
- To implement secure user authentication using Clerk API
- To integrate online payment functionality using Stripe
- To ensure role-based access for students and educators

#### 3.2 Secondary Objectives

- To provide a responsive and modern UI
- To store and manage data efficiently
- To deploy the application on cloud platforms
- To maintain clean version control using Git and GitHub

#### 3.3 Learning Objectives

- Gain practical experience with MERN stack

- Understand API integration
  - Learn secure authentication and payment systems
  - Apply real-world software development practices
- 

## 4. TECHNOLOGIES USED

### 4.1 MERN Stack

#### 4.1.1 MongoDB

- NoSQL document-based database
- Stores users, courses, orders, and progress
- Provides scalability and flexibility

#### 4.1.2 Express.js

- Backend framework for Node.js
- Handles routing, middleware, and APIs
- Enables RESTful services

#### 4.1.3 React.js

- Frontend library for building UI
- Component-based architecture

- Efficient state management

#### 4.1.4 Node.js

- JavaScript runtime for server-side development
  - Handles API requests and business logic
- 

### 4.2 Clerk API

Clerk is used for:

- User authentication
- Login and signup
- Session management
- Role-based authorization

Benefits:

- Secure authentication
  - Easy integration
  - Reduced development time
- 

### 4.3 Stripe

Stripe is used for:

- Secure payment processing
- Course purchases
- Subscription handling

Features:

- Industry-standard security
  - Fast and reliable transactions
  - Easy API integration
- 

#### 4.4 Git and GitHub

Git and GitHub are used for:

- Version control
- Collaboration
- Code backup
- Issue tracking

The screenshot shows a GitHub repository page for 'manudeep07/LMS'. The repository is public and has 16 commits. The main branch is 'main'. The repository has 2 branches and 0 tags. The README file is present. The repository has 0 stars, 0 forks, and 0 releases. It also has 0 packages and 2 contributors.

**Code**

**LMS** Public

main · 2 Branches · 0 Tags

Go to file Add file < Code

**Commits**

manudeep07 Merge pull request #1 from manudeep07/rating-feature · c6e7495 · 3 days ago

public added nav-bar · 3 weeks ago

src added rating component with clickable stars · 3 days ago

.env Updated home page by adding testimonials/companies and ... · 2 weeks ago

.gitignore committed changed files · 3 weeks ago

README.md committed changed files · 3 weeks ago

eslint.config.js committed changed files · 3 weeks ago

index.html committed changed files · 3 weeks ago

package-lock.json updated course details page · last week

package.json updated course details page · last week

vite.config.js committed changed files · 3 weeks ago

**README**

**React + Vite**

About

No description, website, or topics provided.

Readme · Activity · 0 stars · 0 watching · 0 forks

Releases

No releases published · Create a new release

Packages

No packages published · Publish your first package

Contributors

manudeep07 NARASINGU MANUDEEP · mukeshtestgit

Languages

The screenshot shows a GitHub LMS interface with a terminal window open. The terminal is displaying a git log history for a repository. The commits are as follows:

- commit c67e495d0e9c7f5d518a67c45503f0ecf8cc48d (HEAD -> main, origin/main)  
Merge: 5d10f33 c856666  
Author: manudeep1000 <manudeep07@users.noreply.github.com>  
Date: Sat Dec 13 17:13:58 2025 +0530  
  
    Merge pull request #1 from manudeep07/rating-feature  
  
        added rating component with clickable stars
- commit c0568b0effbc778c4b3db79aafc0001e553f9969 (origin/rating-feature)  
Author: manudeep <manudeep1000@gmail.com>  
Date: Sat Dec 13 17:10:53 2025 +0530  
  
    added rating component with clickable stars
- commit 5d10f33f98ab0b5d1ca073a9235a073facb0de86  
Author: manudeep <manudeep1000@gmail.com>  
Date: Sat Dec 13 15:44:56 2025 +0530  
  
    designed player page
- commit 4dbcce321963559b1dc0fffd37239156bafe77c3a  
Author: manudeep <manudeep1000@gmail.com>  
Date: Fri Dec 12 00:12:16 2025 +0530  
  
    designed enrollments page
- commit 2e7cedb938d3bb73f7fc71b733010285a500fae  
Author: manudeep <manudeep1000@gmail.com>  
Date: Thu Dec 11 11:43:10 2025 +0530  
  
    added loading component for course details page
- commit ffb2d1fb344213be01e510104fe3e9bdc61d1375  
Author: manudeep <manudeep1000@gmail.com>  
Date: Wed Dec 10 15:52:48 2025 +0530  
  
    added the course card in course description page
- commit 3b4df5beabab73ff5053b71b5569c977da391dc2  
Author: manudeep <manudeep1000@gmail.com>  
Date: Tue Dec 9 23:57:15 2025 +0530  
  
    updated lecture section
- commit e6703f5e5eab87cf1c82561b64712de878c52c3  
Author: manudeep <manudeep1000@gmail.com>  
Date: Mon Dec 8 23:43:02 2025 +0530  
  
    updated course details page
- commit f114d75d4072a7e7cd5d53d3771f3fb925f7  
Author: manudeep <manudeep1000@gmail.com>  
Date: Thu Dec 4 21:08:27 2025 +0530

```
PS E:\lms\LMS> git log --oneline --graph --decorate
*   c6e7495 (HEAD -> main, origin/main) Merge pull request #1 from manudeep07/rating-feature
|\ \
| * c0566b6 (origin/rating-feature) added rating component with clickable stars
|/
* 5d10f33 designed player page
* 4dbcc32 designed enrollments page
* 2e7cebd added loading component for course details page
* f8b21f1 added the course card in course description page
* 3b4df5b updated lecture section
* e6703f8 updated course details page
* f114d72 added filter courses feature
* fb629c6 developed course-list page
* 7e426ac added changes to buttons and updated footer
* 10f031e Updated home page by adding testimonials,companies and footer
* 0659449 added search bar and companies in hero component
* 2a8f05c added hero section,clerk authentication
* 18b94b9 added nav-bar
* 535c10d committed changed files
PS E:\lms\LMS> █
```

```
PS E:\lms\LMS> git log
commit c6e7495d069c7f5d5d18467c45503f00cf8cc48d (HEAD -> main, origin/main)
Merge: 5d10f33 c0566b6
Author: NARASINGU MANUDEEP <149930469+manudeep07@users.noreply.github.com>
Date:   Sat Dec 13 17:13:58 2025 +0530

    Merge pull request #1 from manudeep07/rating-feature

        added rating component with clickable stars

commit c0566b6ffbc778c4b3db879aafc0001e553f9969 (origin/rating-feature)
Author: manudeep <manudeep1000@gmail.com>
Date:   Sat Dec 13 17:10:53 2025 +0530

        added rating component with clickable stars

commit 5d10f330f98a0b5d1ca073a9233a073facb0de86
Author: manudeep <manudeep1000@gmail.com>
```

---

## 5. SYSTEM ARCHITECTURE

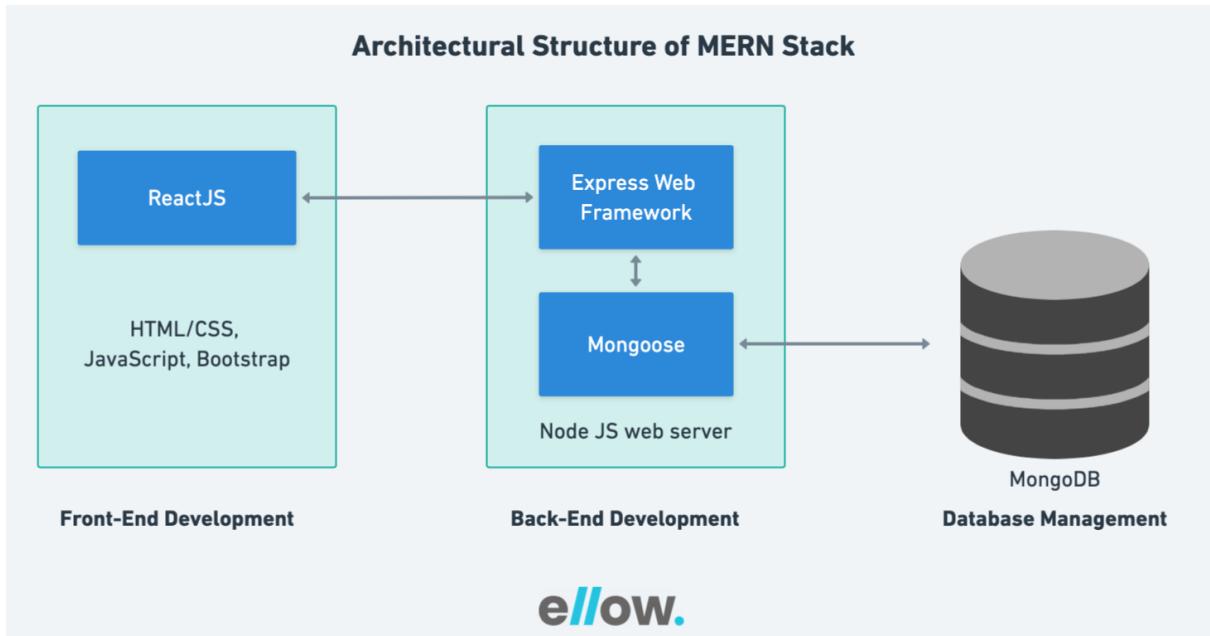
### 5.1 Overall Architecture

The LMS follows a client-server architecture:

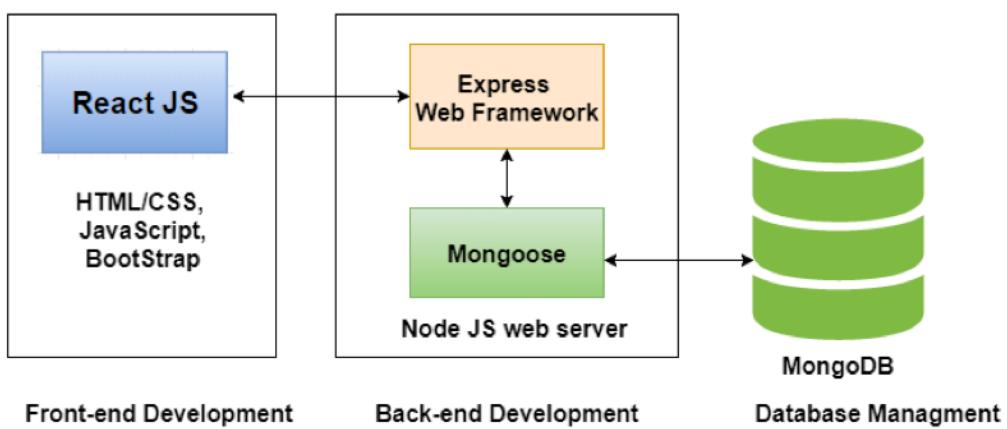
- Frontend: React.js
- Backend: Node.js + Express.js
- Database: MongoDB
- Authentication: Clerk
- Payments: Stripe

---

### 5.2 Architecture Diagram

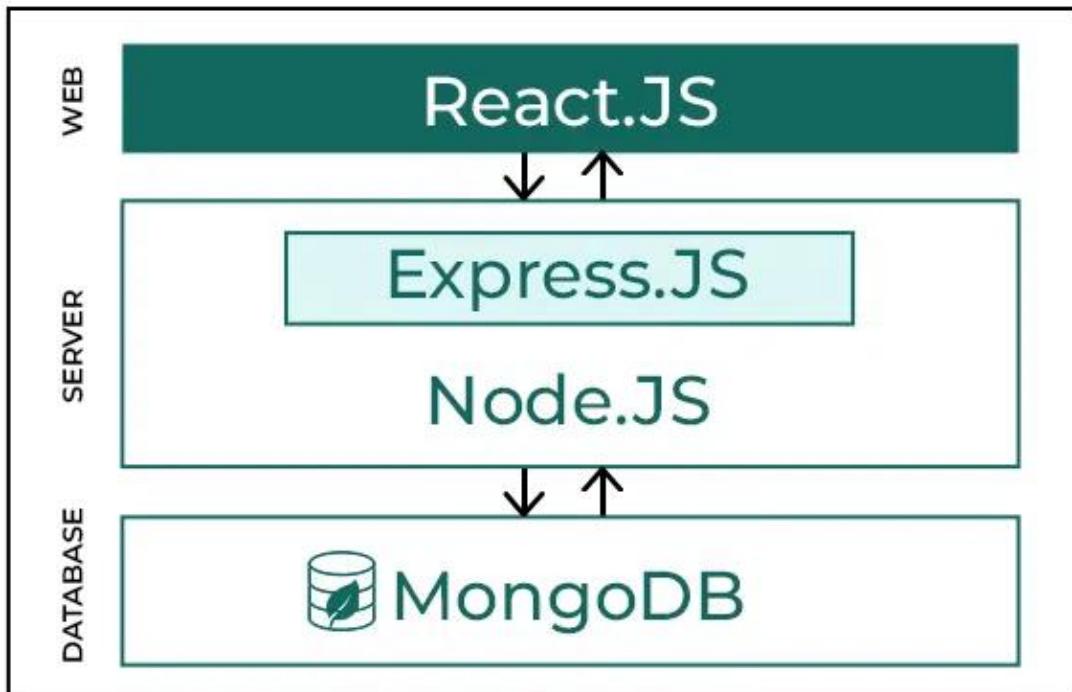


## MERN Stack Development





## How MERN Stack Works?



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## 6. METHODOLOGY

### 6.1 Development Methodology

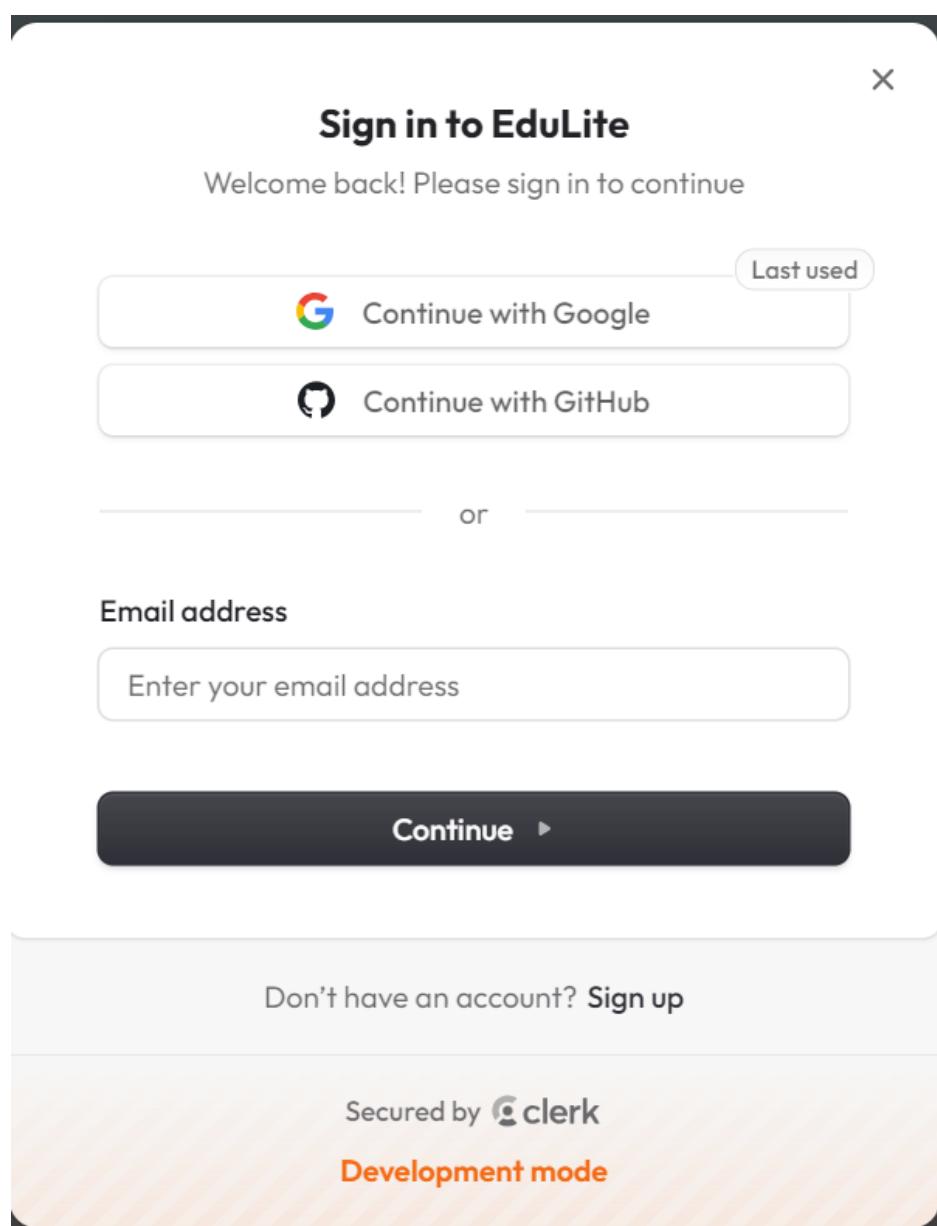
The project follows an Agile Development Methodology, which involves:

- Iterative development
  - Continuous testing
  - Frequent updates
-

## 6.2 Module Breakdown

### 6.2.1 Authentication Module

- User signup/login
- Role assignment
- Session handling
- 



## 6.2.2 Student Module

- Browse courses
- Purchase courses
- Access enrolled content
- Track progress

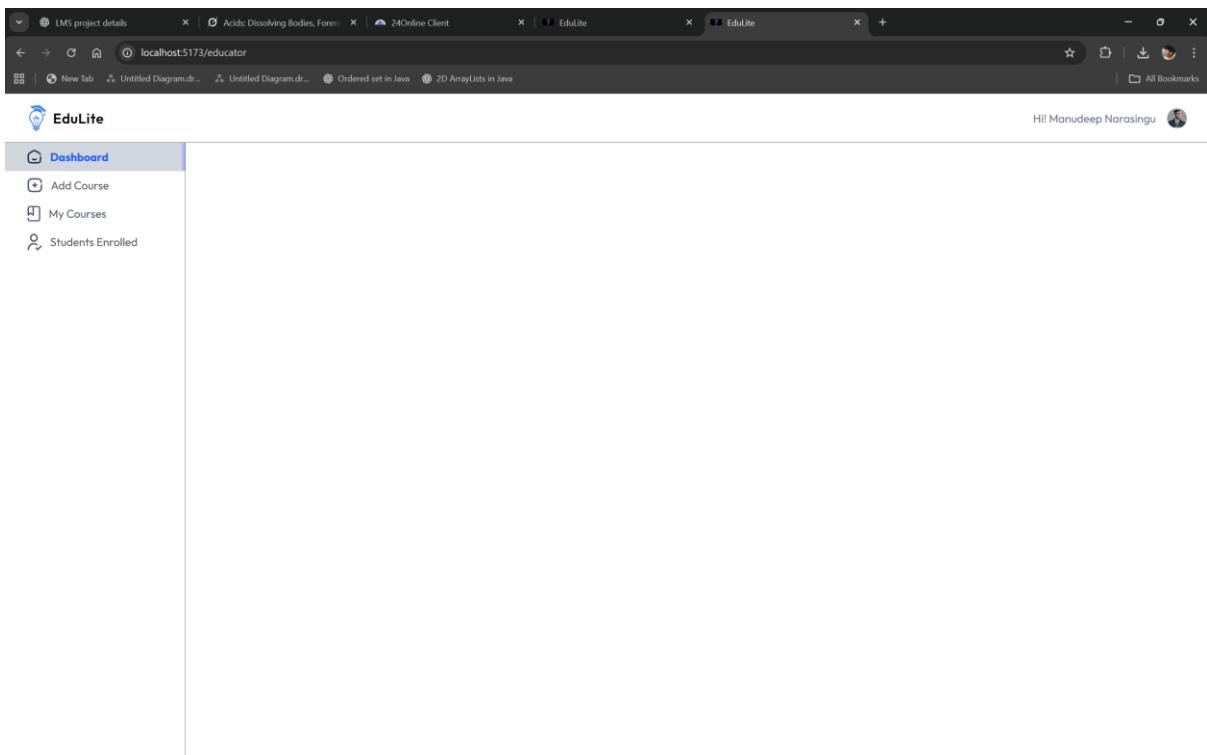
The screenshot shows a web browser window with multiple tabs open. The active tab is titled 'localhost:5173/my-enrollments' and displays the 'EduLite' Educator Dashboard. The main content area is titled 'My Enrollments' and lists seven courses with their details and progress status:

Course	Duration	Completed	Status
Introduction to JavaScript	1 hour, 5 minutes	25%	In Progress
Advanced Python Programming	57 hours	0%	In Progress
Cybersecurity Basics	1 hour, 3 minutes	75%	In Progress
Web Development Bootcamp	49 hours, 30 minutes	100%	Completed
Cloud Computing Essentials	49 hours, 30 minutes	50%	In Progress
Data Science with Python	1 hour, 40 minutes	75%	In Progress
Data Science and Machine Learning	49 hours, 30 minutes	25%	In Progress

---

### 6.2.3 Educator Module

- Create courses
- Upload lessons
- Manage students



---

### 6.2.4 Payment Module

- Stripe checkout
- Secure transactions

- Payment confirmation
- 

## 6.3 Database Design

### 6.3.1 Collections

- Users
  - Courses
  - Orders
  - Progress
- 

## 6.4 API Workflow

- 1.Client sends request
  - 2.Server validates request
  - 3.Database operations performed
  - 4.Response sent to client
- 

## 7. IMPLEMENTATION DETAILS

### 7.1 Frontend Implementation

- React components

- Routing using React Router
- State management
- Responsive design

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**Richard Nelson**  
SWE 2 @ Samsung  
 I've been using Imagify for nearly two years, primarily for Instagram, and it has been incredibly user-friendly, making my work much easier.  
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**James Washington**  
SWE 2 @ Google  
 I've been using Imagify for nearly two years, primarily for Instagram, and it has been incredibly user-friendly, making my work much easier.  
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Learn the Basics of JavaScript

JavaScript is a versatile programming language that powers the web. In this course, you will learn the fundamentals of JavaScript, including syntax, data type

5 ★★★★ (1 rating) (3 students)

Course by [Manudeep](#)

### Course Structure

▼ Getting Started with JavaScript	2 lectures-35 minutes
▼ Variables and Data Types	2 lectures-30 minutes

### Course Description

#### Learn the Basics of JavaScript

JavaScript is a versatile programming language that powers the web. In this course, you will learn the fundamentals of JavaScript, including syntax, data types, and control structures.

This course is perfect for beginners who want to start their journey in web development. By the end of this course, you will be able to create interactive web pages and understand the core concepts of JavaScript.

- Understand the basics of programming
- Learn how to manipulate the DOM
- Create dynamic web applications



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## My Enrollments

Course	Duration	Completed	Status
Introduction to JavaScript	1 hour, 5 minutes	25%	In Progress
Advanced Python Programming	57 hours	0%	In Progress
Cybersecurity Basics	1 hour, 3 minutes	75%	In Progress
Web Development Bootcamp	49 hours, 30 minutes	100%	Completed
Cloud Computing Essentials	49 hours, 30 minutes	50%	In Progress
Data Science with Python	1 hour, 40 minutes	75%	In Progress
Data Science and Machine Learning	49 hours, 30 minutes	25%	In Progress
Introduction to Cybersecurity	51 hours, 40 minutes	75%	In Progress
React.js - The Complete Guide 2025	1 hour, 30 minutes	25%	In Progress
Node.js & Express - Build REST APIs	37 minutes	100%	Completed
UI/UX Design Masterclass with Figma	55 minutes	0%	In Progress
Docker & Kubernetes - Zero to Hero	20 minutes	25%	In Progress
Graphic Design Bootcamp	35 minutes	75%	In Progress
Flutter & Dart - Build iOS & Android Apps	28 minutes	25%	In Progress
Ethical Hacking & Penetration Testing	30 minutes	50%	In Progress
AWS Certified Solutions Architect	22 minutes	50%	In Progress
Digital Marketing Mastery 2025	25 minutes	50%	In Progress
TypeScript for Beginners to Advanced	20 minutes	50%	In Progress



## Course Structure

▼ Getting Started with JavaScript	2 lectures • 35 minutes
▼ Variables and Data Types	2 lectures • 30 minutes

Rate this Course: ★★★★★

---

## 7.2 Backend Implementation

- REST APIs
  - Middleware usage
  - Error handling
  - JWT/session validation
- 

## 7.3 Security Measures

- Secure authentication
  - Environment variables
  - HTTPS
  - Input validation
- 

# 8. TESTING

## 8.1 Types of Testing

- Unit Testing
- Integration Testing

- Functional Testing
- 

## 8.2 Test Cases

Module	Test Case	Expected Result
Login	Valid credentials	Successful login
Payment	Valid card	Payment success

---

## 9. DEPLOYMENT

### 9.1 Deployment Platforms

- Frontend: Vercel
  - Backend: Cloud server
  - Database: MongoDB Atlas
- 

### 9.2 Deployment Process

- 1.Code pushed to GitHub
- 2.Build generated
- 3.Application deployed
- 4.Live testing performed

---

## 10. CONCLUSION

The Learning Management System successfully demonstrates the use of modern web technologies to build a scalable and secure educational platform. The integration of authentication, payments, and role-based access enhances usability and security. This project provided valuable hands-on experience in full-stack development.

---

## 11. FUTURE SCOPE

- Mobile application support
  - Live classes integration
  - AI-based recommendations
  - Certification system
  - Multi-language support
- 

## 12. REFERENCES

1. MongoDB Documentation

2.React.js Official Documentation

3.Node.js Documentation

4.Clerk Authentication Docs

5.Stripe API Documentation

6.GitHub Documentation