

WISDOMWAVE: DESIGN AND DEVELOPMENT OF AN E- LEARNING PLATFORM

BY

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FINAL YEAR DESIGN PROJECT REPORT

This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project titled “**WisdomWave - Design and Development of an E-learning Platform**”, submitted by **Joujoniki Asa Roy** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **26-01-2024**.

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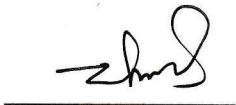
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I hereby declare that this project has been done by me under the supervision of **Lamia Rukhsara, Lecturer (Senior Scale), Department of Computer Science and Engineering, Daffodil International University**. I also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

The digital era is constantly improving our quality of life. It seems that the whole world is in our hands. It has greatly improved our way of learning. E-learning provides flexible opportunities for learning. Learning is accessible to everyone at any time and place, facilitating schedules that are easily adjusted to balance both professional and personal obligations. This abstract introduces “WISDOMWAVE”, an innovative online learning platform that provides learning convenience and accessibility for students worldwide. This project is an effective solution designed to enhance the online learning experience for students, Instructors, and Tutors. With its intuitive interface and advanced features, this project aims to bridge the gap between traditional and virtual learning environments. The unique aspect of this project is hiring online or offline tutors, online support, and its commitment to creating a secure and trustworthy online learning environment. The platform implements robust security measures to protect user data and transactions and encourage students to engage in educational activities without hesitation. This project also acknowledges the importance of social interaction in the e-learning realm. The platform integrates a blog feature, allowing users to share their insights, questions, and feedback for any course, fostering a sense of community and engagement around the learning experience. Additionally, this project facilitates learner feedback and reviews.

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CHAPTER 1

Introduction

1.1 Overview

The prevalence of e-learning has witnessed a remarkable change in recent years, remote learning is a profound transformation in the landscape of education within the digital era. WISDOMWAVE is an e-learning platform, similar to another e-learning platform, that offers unique features that make it more interactive. The primary goal of this platform is to completely transform online education and enhance learner engagement and interaction by effectively responding to the various demands of users.

It will maintain four types of users. These are:

- Student.
- Instructor.
- Tutor.
- Admin.

In this project, each course offers live support, so that students can receive course-related live support in their enrolled course, join discussions for social interaction, and hire online or offline tutors by visiting the tutors' profiles. The Tutor can teach online tuition from this platform and can keep track of their progress.

1.2 Background and Present State

The COVID-19 epidemic has accelerated the notable trend towards digital learning that has occurred in recent years. The needs of contemporary learners, who prioritize adaptability, accessibility, and interactive content, have proven difficult for traditional educational approaches to match. Platforms for online learning have become a viable option, offering a large selection of courses that are accessible from any location at any time. These platforms meet a variety of educational demands, including those related to professional development, specialized training, and elementary education. Technological developments, more people having access to the internet, and the growing acceptance of online learning have all contributed to the growth of e-learning platforms. To improve the learning experience, e-learning systems are incorporating innovations like virtual reality, machine learning, and artificial intelligence. Personalized learning is made possible by these technologies.

There are several platforms available in the present e-learning market that provide a range of courses and learning opportunities. Prominent online learning environments, such as Khan Academy, Udemy, and Coursera, have high expectations for both user experience and material quality. The market is still fragmented, though, with a lot of specialty platforms that concentrate on particular topics or professional abilities.

1.3 Problem Statement

I have observed current e-learning platforms that offer a large selection of courses, they often lack real-time interaction, social interaction, and personalized learning environment. These deficiencies can make the learning experience less engaging and effective for some students.

1.4 Objectives

The objectives of our platform are-

- Design and develop an engaging user interface from which students can learn as much as they like with interest.
- Create a diversity of courses.
- Provide live classes in each course.
- Secure the transaction system and make the transaction easy for native users.
- Make students more engaged in the discussion forum by creating and replying to discussions.
- Allow students to create a tutor hiring post and hire a tutor online or offline.

Together, these objectives result in an efficient, user-friendly web-based e-learning platform that meets the demands of students, instructors, and tutors.

1.5 Scope and Limitations

This project can be used by any student from anywhere. It serves three main user categories: instructors, tutors, and students. It is a dynamic and all-inclusive learning environment.

- Students: They can look for tutors, purchase and sign up for courses, and watch live classes. In order to identify qualified tutors, students can make requests for tuition. They can also participate in discussions to assist one another and learn together.

- Tutors: In order to draw pupils, tutors can make comprehensive profiles. They are able to reply to tuition posts, have direct interactions with students.
- Instructors: Teachers have the authority to design and oversee classes, including adding quiz, class, and announcements.
- Admin: Admin users are in charge of managing and keeping up the platform's features, which guarantees a pleasant user experience, excellent content, and smooth operation.

Using the newest technology, the platform is made to provide an interactive and stimulating learning environment that offers support and feedback in real time. It provides an adaptable and easily available learning solution with the goal of bridging the gap between instructors and students.

The platform has many limitations that could impact its user experience and performance, even with its abundance of features:

- Technological Limitations: The users' devices and internet access have a major impact on the platform's performance. Outdated technology or bad internet connections might make learning more difficult.
- Limited Funding: The platform's capacity to consistently improve its infrastructure, incorporate new technologies, and provide high-quality service may be impacted by financial constraints.
- Privacy and Security Issues: Preserving privacy and guaranteeing the security of user data is an ongoing challenge. Strong security measures are required for the platform to guard against illegal access and data breaches.
- User Adaptability: Using the platform's capabilities to their fullest potential may be difficult for many users, especially those who are not as experienced with digital technologies.

It can be difficult to uphold a high degree of material quality and guarantee uniformity throughout different courses, particularly when working with a diverse set of tutors and instructors.

1.6 Report Organization

Developing a comprehensive report layout for " WisdomWave – Design and Developed for an E-Learning Platform" requires segmenting the document into several parts to emphasize the project's details. Here, the figure 1.6.1 shows the project's layout:

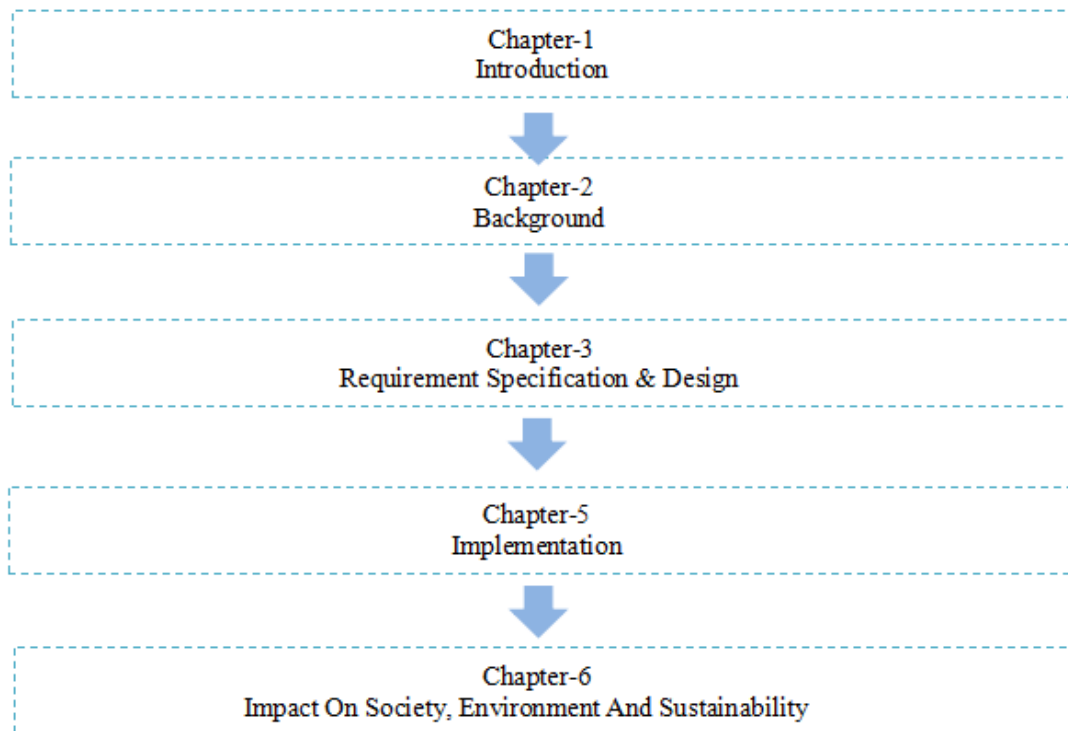


Figure 1.6.1: Report Layout of this Project.

1.7 Summary

My project intends to revolutionize the e-learning experience by developing a personalized, real-time assistance platform that encourages social interaction. By meeting instructors', students', and tutors' needs, the platform will contribute to the success and engagement of e-learning.

CHAPTER 2

Background

2.1 Overview

In 1960, Professor Don Bitzer from the University of Illinois created the first computer-based e-learning technology, called the PLATO and it was groundbreaking for its time [6]. E-learning website acts as an e-learning platform where users can advance their learning as students. Here, they can receive a top-notch education virtually. How the users and the instructor monitor their progress is remarkable. With the help of this website, educators and students alike can increase their global knowledge.

2.1.1 Terminologies

Here are terminologies related to "WisdomWave – Design and Development of an E-Learning Platform":

- **E-Learning Platform:** An e-learning platform is a space which facilitate education through online. It provide the facilities to create and purchase courses.
- **Admin:** Admin monitors the platform and manage all user's activity. System maintenance and updates administrated by admin.
- **Student:** A user role as learner. They can explore courses, purchase courses and learn from recorded video and live classes, find tutors and participate in discussion with other students to solve any problem.
- **Instructor:** A user role as teacher. They can create and modified courses, manage live classes quizzes and certification.
- **Tutor:** A tutor on this platform can create a profile and find tuition from the posts posted by the student.
- **User Interface(UI):** The graphical user interface (GUI) is very important so that tutors, students, instructors, and admin may all engage with the platform. It consists of design components, navigation, and user experience.
- **Agile Development:** Agile is a software development methodology that

prioritizes iterative improvements, adaptability, and teamwork. Its main goals are to adjust to changes and keep improving the features and functionalities of the platform. Scrum is a method of agile development.

- Security protocols: Security measures taken for security, integrity, and privacy of the data of the platform. The objectives of these protocols are to safeguard user data, stop illegal access, and keep all interactions secure.
- Scalability: The ability of the platform to support expanding workloads, more users while sustaining maximum usability.

2.2 Related Work

There are a few e-learning platforms similar to my project. But my project has some additional features, that will be very useful for students, and that makes this project very engaging.

- Available E-learning Platforms: I examined and evaluated the current state of modern web-based e-learning environments in my research, concentrating on well-known organizations like Coursera, Khan Academy, 10 Minute School, Udemy, and StudyPass. Each platform offered unique features and benefits modified to diverse educational requirements. Udemy is famous for its diverse course catalog, live time access, and reasonable prices, but the inconsistent quality is the drawback of this platform. While Coursera is well-known for providing academic courses from renowned universities, it offers very few courses outside of academics, and its higher course fees are the main drawback even if it offers some free courses. Except for advanced course options, Khan Academy offers free, excellent educational resources mostly for K–12 education. Both 10 Minute School and StudyPass were designed with a limited variety of courses. They only target a specific group of students. All of them have a common drawback in that they have very few live classes and mostly prerecorded course videos. This analysis helped me make decisions for learners who are looking for flexible, accessible, and reliable educational opportunities by giving me important insights into the features, innovations, and user experiences that shaped modern e-learning environments.
- User Interface and Experience (UI/UX): When it comes to user interface and experiences e-learning sites such as Udemy, Coursera, Khan Academy, 10 Minute School, and StudyPass all have unique ways of improving accessibility and user engagement. Udemy provides easy-to-use search and classification

tools that make finding courses easier. User may quickly search courses according to their preferences with simple navigation. Coursera places a strong emphasis on well-organized learning pathways and has a simple interface designed for academic programs from all over the world. To encourage participation, it has interactive features like tests and peer evaluations. Khan Academy maintains a simple user interface (UI) with an emphasis on educational content and a user-friendly design that facilitates learning advancement through interactivity and customized dashboards. Platforms such as 10 Minute School and StudyPass provide personalized content along with features like a few live classes and interactive quizzes to improve student engagement and academic results. Through personalized recommendations, simple navigation, or interactive learning tools, the UI/UX design of each platform significantly influences user interactions and learning experiences.

- **Security Measures in Web Applications:** It is essential to implement Encryption methods, compliance requirements, and industry-standard security processes to protect the user data and platform security. Udemmy implements strong data protection like SSL/TLS for data encryption, frequent security audits, and GDPR compliance. Coursera complies with global data protection regulations, such as GDPR, and employs SSL/TLS and data encryption. They guarantee excellent security standards by concentrating on academic relationships. In addition to using encryption technology and HTTPS for secure communications, Khan Academy complies with COPPA regulations to protect the privacy of minors. 10 minute school might not adhere to local data protection regulations, it uses HTTPS and simple encryption measures. StudyPass implements industry-standard security procedures, such as HTTPS and encryption, with a focus on user data protection and local compliance.
- **Agile Development Methodologies:** Web-based applications are different from traditional ones since they require constant maintenance and have higher levels of security, usability, and dependability. They also incorporate cutting-edge technologies and have shorter time to market and product life cycles. Web applications of the highest quality must have a quick development cycle, be affordable, and make use of appropriate measurement tools. Effective software development relies on software measurement, which lowers costs, minimizes rework, shortens development cycles, boosts productivity, and enhances customer satisfaction. Web-based application development requires different approaches than waterfall and spiral development [8]. For this e-learning platform, the scum approach of the agile development process is crucial.

- Academic Research in E-learning platform: By researching some articles I learned that during pandemic, forced a quick switch from traditional to online classes, which emphasizes how important it is to adjust to digital teaching approaches. E-learning is an essential tool for instructors and students alike because it provides unmatched flexibility, accessibility, and a wide variety of instructional resources.

I have created inventive, safe, and adaptable e-learning platforms that satisfy the demands of contemporary learners by looking at these important areas. Creating efficient and user-friendly e-learning environments requires implementing strict security measures, embracing Agile development approaches, integrating cutting-edge technologies, and utilizing academic research.

2.3 Comparison between existing works

A comparative analysis for "WisdomWave – Design and Development for a E-learning Platform" include evaluating comparable systems or platforms that are currently in use. This table: 2.3.1 is a summary of a comparative study:

Table: 2.3.1 Comparison between existing works

SL No	Features	Udemy	10 Minute School	Coursera	Study Press
1	Discussion Forum	Yes	No	Yes	No
2	Video Tutorial	Yes	Yes	Yes	Yes
3	Course	Yes	Yes	Yes	Yes
4	Online live Class	No	No	Yes	Yes
5	Live class For Each Course	No	No	No	No
6	Find Tutor	No	No	No	No
7	Find Tuition	No	No	No	No
8	Create Tutor Profile	No	No	No	No
9	Tutor Dashboard	No	No	No	No

10	Manage Classes	No	No	No	No
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- **User Interface (UI) and Experience (UX):** To determine what makes an outstanding e-learning platform, I assessed the UI/UX designs of popular platforms like Udemy and Coursera. Key elements include the design and navigation, which impact how easily users may navigate dashboards, courses, and other services. Responsiveness is also essential for functioning properly across a range of devices and screen sizes. A clean, contemporary design considerably improves the user experience. The main goal of this platform is to provide a better user experience. My focus is on creating an interface that is visually appealing, engaging, and simple to use so that users can locate and access material with ease.
- **Security and Privacy Measures:** When evaluating the security and privacy protocols of top e-learning platforms, I examined the safeguards put in place to preserve user information, including secure payment channels and encryption. Additionally crucial are privacy protections, which guarantee that user data is not mishandled or disclosed without authorization. I used privacy protocols like encryption for user data.
- **Customer Support and Engagement:** In order to assess the customer service and engagement tactics of leading platforms, I examined the accessibility of live chat, frequently asked questions, support systems, and feedback mechanisms. Our platform offers first-rate customer service via a number of methods, such as email and thorough FAQs.
- **Market Position and User Reviews:** Analyzing market share, ratings, reviews, and user comments of top e-learning platforms allows us to identify prevalent problems and gain insight into customer satisfaction. It helps in identifying advantages over existing e-learning platforms, as well as its shortcomings, allowing for ongoing improvement and the preservation of my competitive advantage.

Comprehensive comparative research offers important insights into the prospects, dangers, threats to, and strengths of our e-learning platform. It enables me to make better adjustments and enhancements, which helps me keep my competitive advantage in the market.

2.4 Open Issues

"WisdomWave – Design and Developed for an E-Learning Platform" has significant challenges in developing features like finding tutors, live classes, and quizzes. Managing different user roles, such as Tutors, Instructors, Students, and Admins with various access and permissions is difficult. Another crucial challenge is scalability. The platform needs to be able to manage a growing number of users, courses, and live classes without experiencing performance problems. Content management needs to be user-friendly and easy to facilitate course management and distribution and learning materials. Ensuring security and privacy is crucial to protect user data but it has challenges.

2.5 Summary

E-learning websites are becoming an increasingly advanced learning model around the world. E-learning for technical education and higher education at home has been widely adopted. It is gradually becoming a very important educational system in this decade. Some websites fail to attract users due to their design so doing a gap analysis is very important.

CHAPTER 3

Requirement Analysis & Design Specification

3.1 Overview

Requirements gathering, design, construction/iteration, testing, deployment, and feedback are part of the Agile model. Each phase creates a workable product increment that the client can evaluate within a short period.

3.2 System Design

The project is based on the Agile model. It helps to complete a project quickly. There are many methods of the Agile model. Scum is one of the popular methods of the Agile model. The model consists of six steps. The steps are:

- Requirement gathering
- Design the Requirements
- Construction / Iteration
- Testing / Quality Assurance
- Deployment
- Feedback

3.2.1 Business Process Modeling

Creating a process flow map for the " WisdomWave – Design and Development for an E-learning Platform" means outlining each stage of the process, from user registration and login to course purchases, payment processing, and overseeing tutor and instructor material creation. By simplifying processes and improving user experiences, figure 3.2.1.1 is a business process modeling, that makes clear the interactions that take place between students, instructors, tutors, and platform admin.

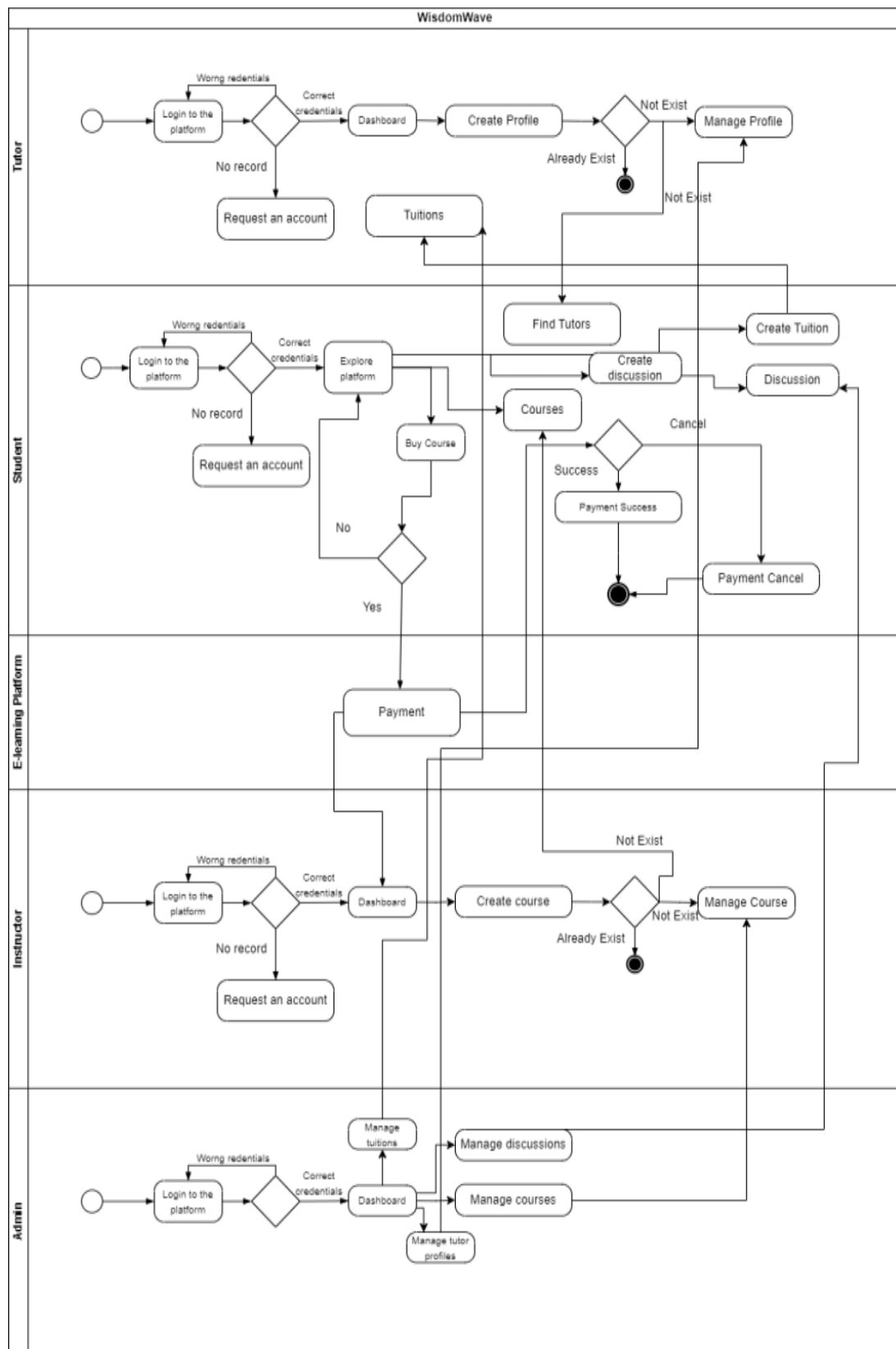


Figure 3.2.1.1: Business Process Modelling

3.2.2 Use Case Modeling

Use Case Modeling represents user information. It contains all the activity information about the user. It reports high-level overviews of actors, activities, and systems. Using this diagram professional or non-professional people can understand the user's work and the features of the system. In this system user is only able to see the courses, and discussion features without login. To explore other features, users need to create an account and log in. Figure 3.2.2.1 shows the use case diagram of "WisdomWave".

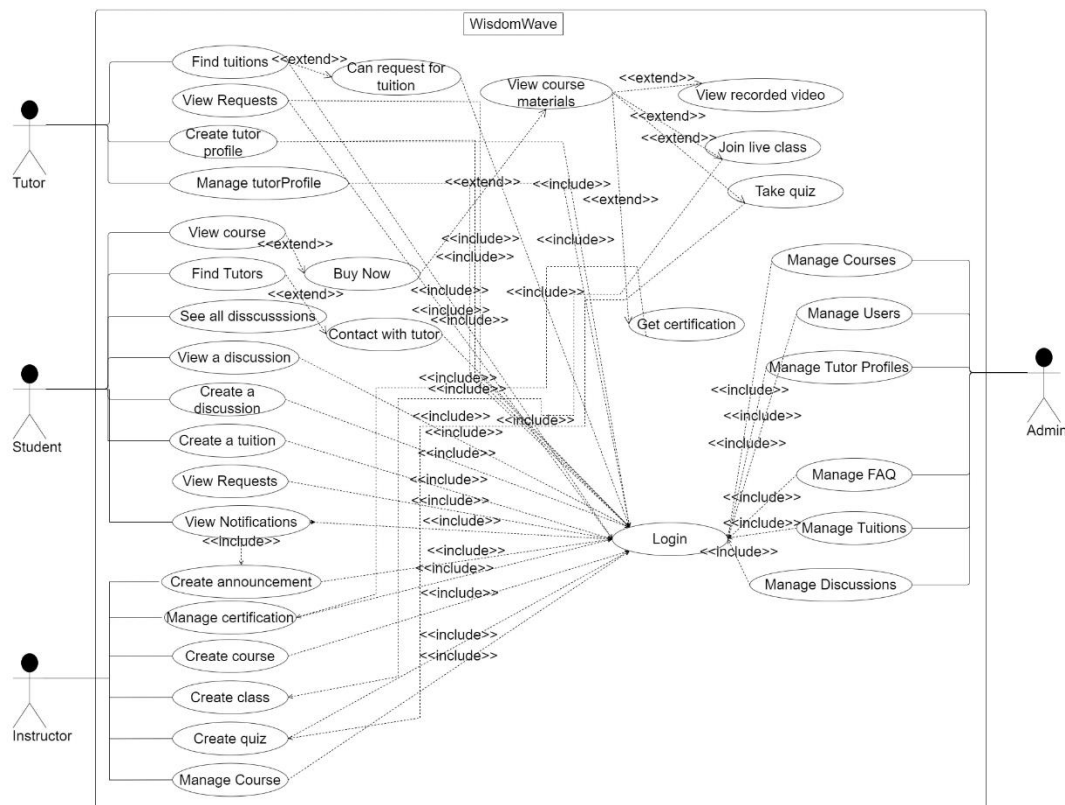


Figure 3.2.2.1: Use Case Diagram.

3.2.3 Logical Data Model

In order to ensure that business goals are accurately satisfied, logical data models are an essential tool in the design and development of databases. They provide an abstract and clear representation of the data and its relationships. "WisdomWave – Design and Development for an E-learning Platform" has an Entity Relationship Diagram (ERD). Representing collections and their relationships is necessary when creating an Entity-Relationship (ER) diagram for an e-learning platform with MongoDB. As a NoSQL database, MongoDB allows for the representation of relationships through embedded

documents or references. Figure 3.2.3.1 shows the logical data modeling diagram of "WisdomWave".

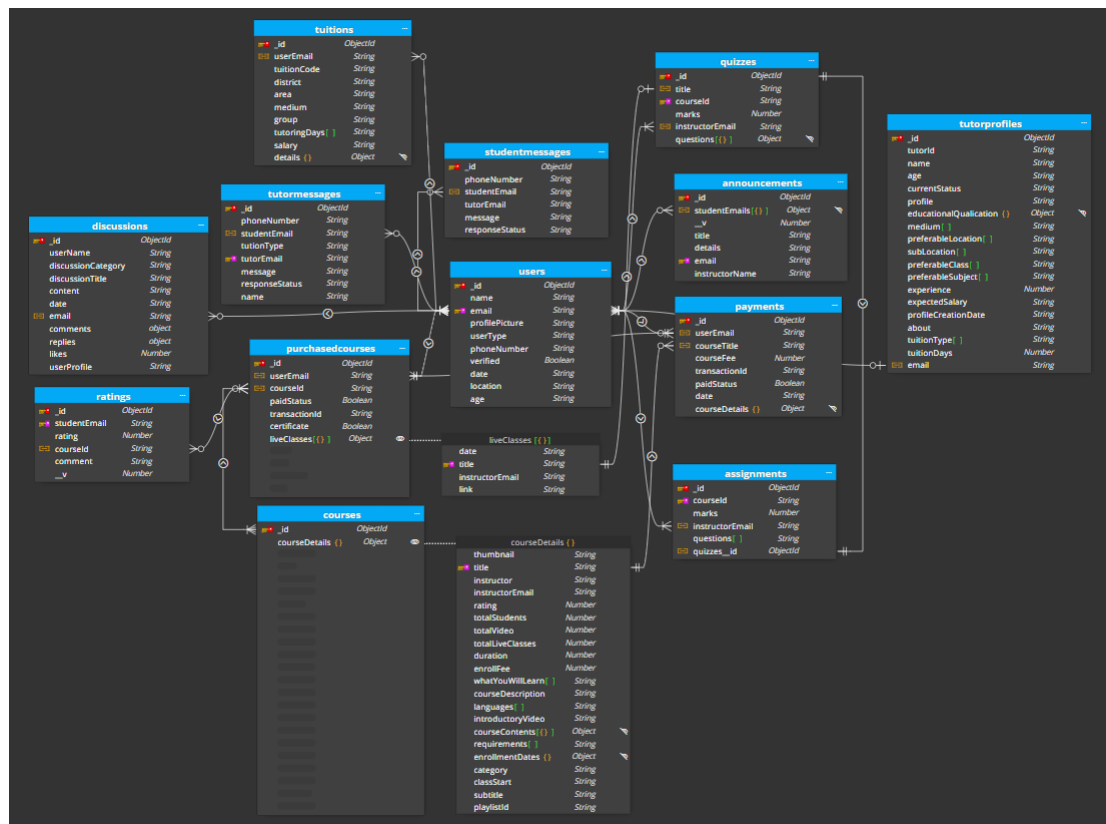


Figure 3.2.3.1: Logical Data Modeling Using Entity Relationship Diagram.

3.2.4 Data Flow Diagram

A data flow diagram is a graphical representation of data in the system. It uses the circles, arrows, and rectangles. At first, the user needs to choose the user type to login. After login as a student, he can purchase courses, participate in discussions, get live support for their enrolled courses, attend live classes, monitor their quizzes and assignments, and hire tutors for online tuition. If he is an instructor, he can add courses, manage courses, quizzes, assignments, and exercises, and monitor students. If he is a tutor, he can create a tutor profile at tutors, manage an online student, task, and join an online class. The admin is allowed to manage the course, user activity, and admin. Figure 3.2.2.1 shows the flow diagram of "WisdomWave".

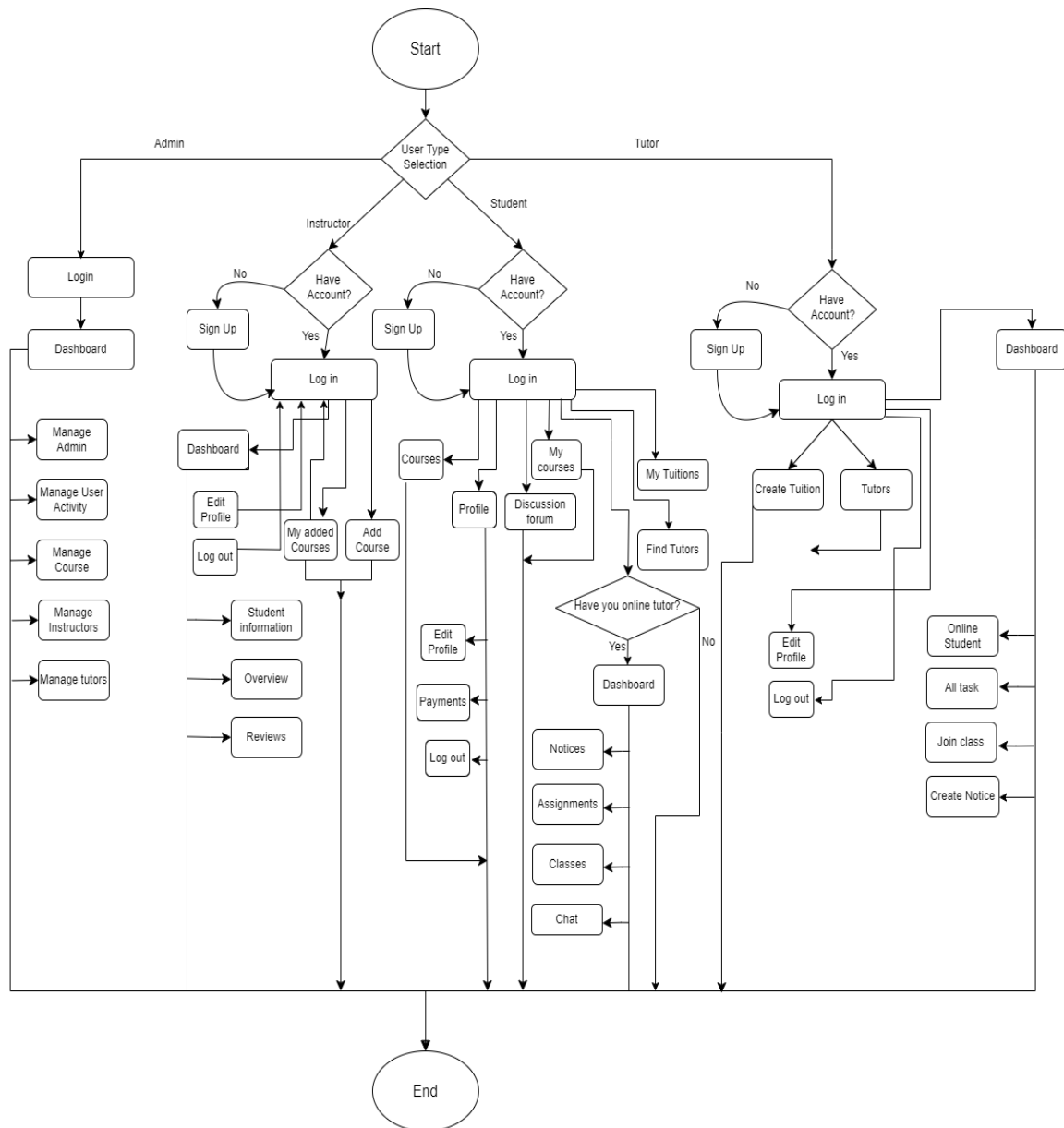


Figure 3.2.4.1: Data-flow diagram

3.3 Software Requirement

This task is concerned with the planning, documentation, analysis, validation, and management. The primary goal is to determine the expected outcome of the project. I help to understand the user's needs and requirements. It is a crucial stage of the Software Development Life Cycle (SDLC).

The software I used in this report is given below:

- Visual Studio Code(VS Code): VS code is a strong and adaptable source code editor by Microsoft.

- Laptop: I used my laptop, provided by our university, for this project. Any type of laptop can be used for this project.

Functional Requirement:

The Functional requirements specify the main features of projects. The functional requirements of this e-learning platform needed to be met can be printed out as:

Students:

- Find Courses
- Buy Courses
- My courses
- Course Dashboard
- Join Class
- Take Quiz
- Notifications
- Create Discussion
- View Discussion
- Create Tuition
- Rating
- Find Tutors

Instructors:

- Courses
- Add course
- Manage Courses
- Manage Classes
- Create Quiz
- Provide Certificate
- Create Announcement

Tutors:

- Find Tuition
- Dashboard
- Create Profile
- Manage Profile

Admin:

- Manage Admin
- Manage Users
- Manage Courses
- Manage Tutors
- Manage Tuitions
- Manage FAQs
- Manage Discussion Forum

Non- Functional Requirements

The set of requirements specifications that outline how a system can satisfy the needs is known as the non-functional requirements.

- Security
- Privacy
- Reliability
- Performance

3.4 Project Management and Financial Analysis

❖ Project Goals:

- To create an easy-to-use learning environment
- To develop a personalized learning platform with for tutor
- Create a diversity of courses
- Provide live classes and quizzes for each course
- Improve the social interaction by the discussion forum

❖ Project Timeline:

- Phase 1: Research and Project Planning (1-4 weeks)
- Phase 2: Prototyping and Design (6-7 weeks)
- Phase 3: Development of the front end (9–10 weeks)
- Phase 4: Development of the back end (10–12 weeks)
- Phase 5: Examination (3–5 weeks)
- Phase 6: Deployment (three to four weeks)

❖ **Resource Planning:**

- **Equipment and Tools:**

- Servers for Testing and Development
- Computers.
- GUI Design (e.g., Figma)
- IDE (e.g., Visual Studio Code)
- Tools for Testing (e.g., Postman)

- **Software and Technologies:**

- Front-end (e.g., HTML, CSS, JavaScript, React)
- Back-end (e.g., Node.js, Express JS)
- Database Management System (e.g., MongoDB)
- Authentication and Authorization (e.g., Firebase, JWT)
- Server Hosting (e.g., Vercel)
- Payment Gateway Integration (e.g., bKash)

- **Data and Content:**

- Course Details: Provided by instructors
- Tutor Profile: Provided by Tutors
- Discussion Details: Provided by students/instructors
- User Documentation: The technical writing team prepared the user documentation

- **Training and Skill Development:**

- Training and Skill Development: Ascertain that the development team possesses the required knowledge and abilities in database management, security, and e-learning creation.
- Offer supplementary training on certain technologies and tools as required

❖ **Risk Management:**

Analyzing a project's SWOT entails determining its advantages, disadvantages, opportunities, and threats. Here is the table 3.4.1, a SWOT analysis for the e-learning platform WISDOMWAVE:

Table: 3.4.1 Risk Management

INTERNAL	STRENGTHS	WEAKNESSES
	It reduces the cost compared to the traditional learning system It provides diverse courses with live support It provides a personalized learning environment It is also eco-friendly	Self-motivation does not work for certain learners, it raises a challenge For some learners who do not have devices, the internet will not benefit them here
EXTERNAL	Students can learn from anywhere. Online tutor hiring offers a larger audience and flexibility It helps to break the geographical limitations	The e-learning platform is very popular today, so it is very competitive Data privacy and cyber security risk Staying updated with new technology is essential
	OPPORTUNITIES	THREATS

❖ **Communication Plan:**

● **Stakeholder Meetings:**

Goal: Inform stakeholders about project needs, progress, and input.

Participants: Stakeholders as well as team members.

Frequency: Every two weeks, or as the project plan specifies..

- **Change control Meetings:**

Goal: To discuss and approve modifications to the project's requirements or scope.

Participants: Team members and the supervisor.

Frequency: Whenever requests for changes are made.

❖ **Estimated Cost:** Table: 3.4.2 shows the estimated cost of the e-learning platform WISDOMWAVE

Table: 3.4.2 Estimated Cost

SN	Components	Estimated Cost (BDT)
01	Domain and Hosting	1500 - 2000
02	Visiting Stakeholders	500 - 1000
03	Doing Online Course or Training for learning new technology	5500 – 6000
04	Documentation and Report Writing	500 - 1000
05	Miscellaneous (e.g., licenses, tools)	25,000 – 30,000
06	Contingency (10% of total)	3300 - 4000
Total Estimated Cost		33,000 - 40,000

3.5 Summary

This project aims to provide an effective and engaging e-learning platform, where student is allowed to buy courses join in discussions, live support, live classes, monitor their quizzes and assignments, and hire tutors for online tutors. Instructors can track student activity, track quizzes, assignments, and exercises, and can add courses. The tutor can manage online students, and tasks and can join online classes User activity, and courses can all be managed by the admin.

CHAPTER 4

Implementation

4.1 Overview

The web-based e-learning platform's front-end and back-end design implementation entails creating two integrated components that function flawlessly together to offer a reliable, user-friendly experience. While the back-end takes care of data administration, server-side operations, and business logic, the front-end concentrates on the user interface and user experience.

4.2 Prototype Design

An interactive and graphical representation of the primary features and user interfaces is the goal of the prototype design for this "WisdomWave – Design and Development of an E-Learning Platform" project. Developers and designers can see exactly how the platform will appear and work before full-scale development starts due to the prototype, which acts as a blueprint. This guarantees the satisfaction of user requirements and expectations and the early detection of any possible problems.

4.2.1 Implementation of Front-end Design

The front-end design for an e-learning platform is essential because it establishes the interactive aspects and visual elements for user experience. It makes the platform approachable and user-friendly. All of the content that users view and interact with on the platform is part of the front end. To create an intuitive interface that makes it easier for users to interact with the system, important technologies like HTML and CSS are used in front-end design. The front-end design of an e-learning platform is crucial since it not only attracts users but also ensures they can navigate and engage with the platform effortlessly. This project aims to provide a front end that is simple to use and enables smooth user interaction.

To achieve this, I have used several well-known frameworks and libraries. These include:

- **React Framework:** React is a renowned JavaScript framework used to create dynamic user interfaces. It supports the creation of challenging and responsive user interface (UI) components, improving the overall user experience (UX)

- **DaisyUI:** DaisyUI is known as a component library that works as a plugin for Tailwind CSS, which is a low-level, highly configurable CSS framework. DaisyUI provides a robust collection of pre-built components that are simple to use with Tailwind CSS to integrate and customize within the project.
- **Axios Library:** Axios is used to send HTTP requests from a browser to a server. It handles request cancellations and enables promise-based operations, enabling dependable and effective connection with the server.

Home page: Figure 4.2.1.1 is home page, it serves as the central hub for users providing an overview of all courses, course details, categories, tutors, discussions, and simple navigation for join and login to the website. It has a user-friendly layout with smooth navigation and quick access to important features. They can find courses by category. Additionally, the home page has a search box that makes it easy for users to find a particular course.

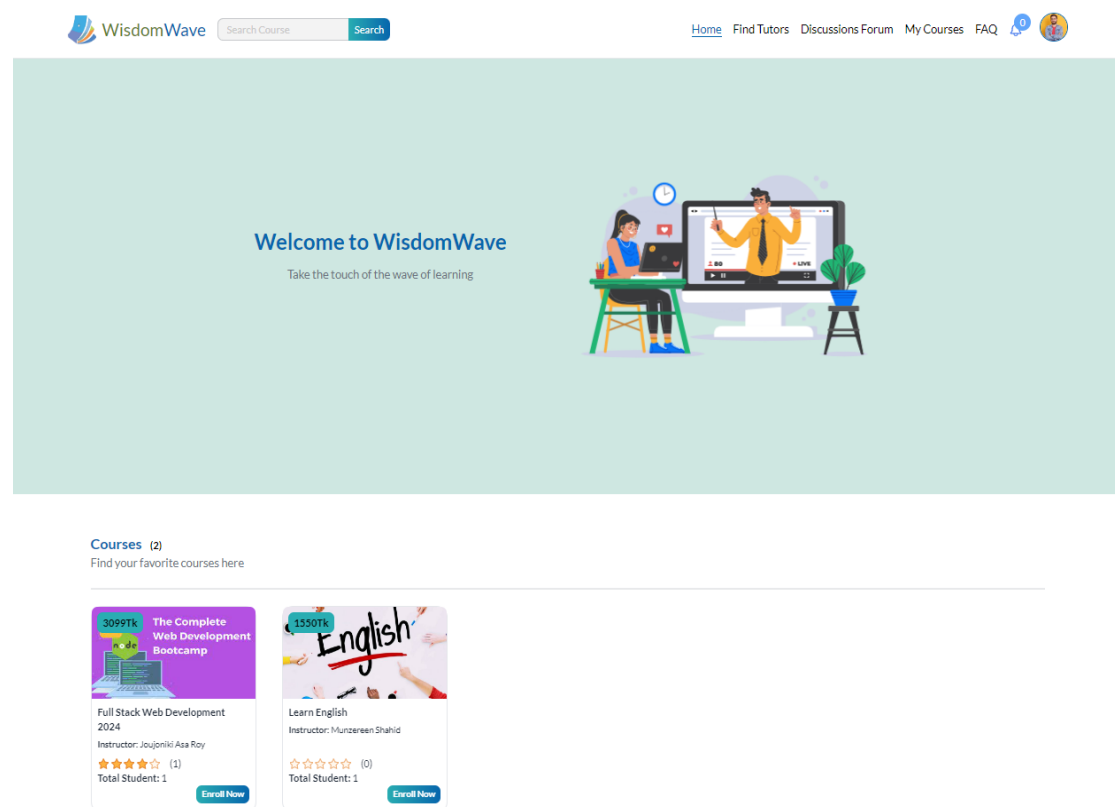


Figure: 4.2.1.1 Home Page

A page for joining as a student: Figure 4.2.1.2 is the sign up page for students, when users want to join the e-learning platform as a student, they must choose the “Student” option from the “Join” navigation menu. They need to fill out a registration form with some basic information about themselves.



First Name

Last Name

Choose File No file chosen

Date of birth

Phone

Email

Password

☐ Accept the Terms and Conditions

Sign Up

Already have an account? [Login here](#)

Figure: 4.2.1.2 Sign Up Page for Student

A page for joining as an instructor: Figure 4.2.1.3 is the sign up page for instructors, when users want to join the e-learning platform as an instructor, they must choose the “Instructor” option from the “Join” navigation menu. They need to fill out a registration form with some basic information about themselves.



First Name

Last Name

Choose File No file chosen

Date of birth

Phone

Email

Password

☐ Accept the Terms and Conditions

Sign Up

Already have an account? [Login here](#)

Figure: 4.2.1.3 Sign Up Page for Instructor

A page for joining as a tutor: Figure 4.2.1.4 is the sign up page for tutors, when users want to join the e-learning platform as a tutor, they must choose the “Tutor” option from the “Join” navigation menu. They need to fill out a registration form with some basic information about themselves.



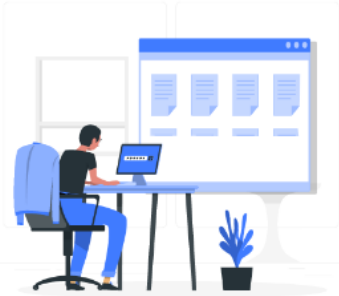
No file chosen

☐ Accept the Therms and Conditions

Already have an account? [Login here](#)

Figure: 4.2.1.4 Sign Up Page for Tutor

The "Login" page: Figure 4.2.1.5 is the login page, designed for user authentication.



[Forget Password](#)

New at WisdomWave? [Join](#)

Figure: 4.2.1.5 Login Page

The "Find Tutors" page: Figure 4.2.1.6 is designed to find the tutors by their profile. Students can find tutors by using specified locations or areas which helps them to select the best tutors for their needs. Students must log on to the platform to view the information and request a tutor. Once students have successfully logged in, they may request tutors directly by submitting a form.

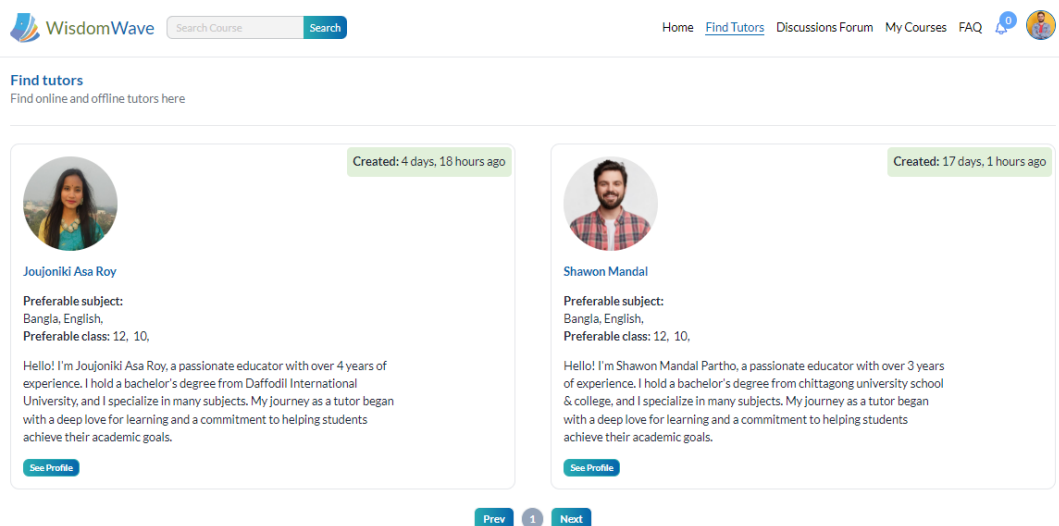


Figure: 4.2.1.6 Find Tutors Page

The "Create Discussion" page: Figure 4.2.1.7 "Create Discussion" is designed to create new discussions on the forum.

Your Name*

Shawon Mandal

Discussion Category*

Discussion Topic*

Discussion Content*

B I U Normal

Publish

Figure: 4.2.1.7 Create Discussion Page

The "Payment Gateway" page: Figure 4.2.1.8 is a payment gateway page. A user needs to use sslcommerze in order to buy a course from this platform. They have access to

DDBL, bkash, online banking, nagad, and other payment options.

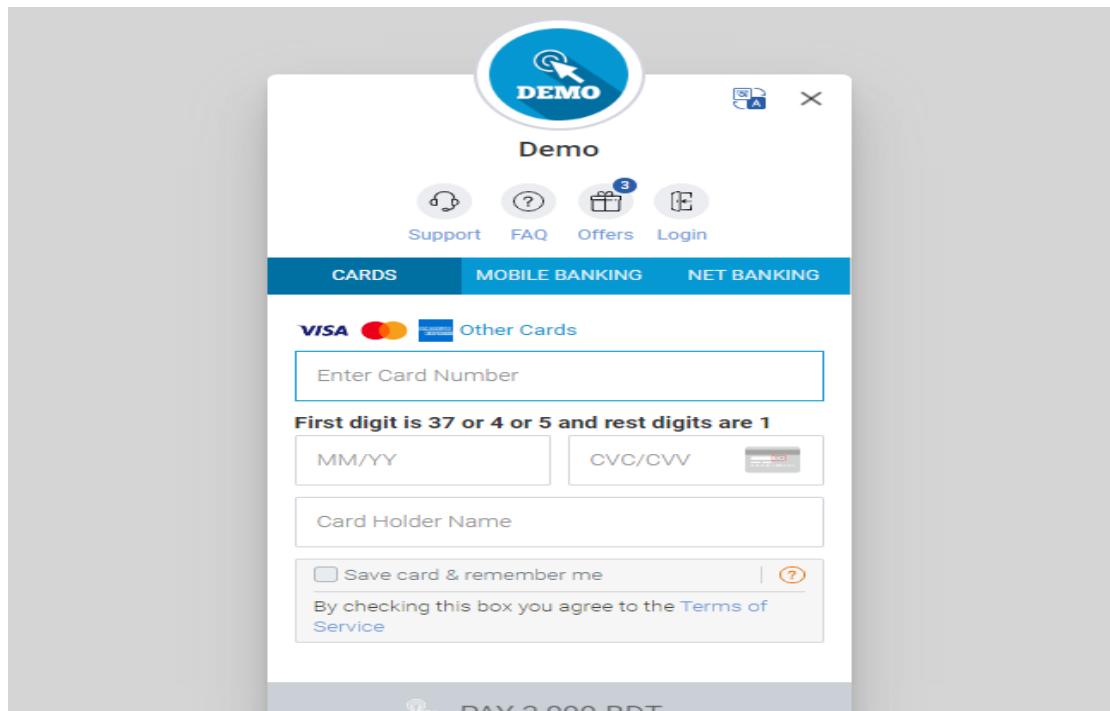


Figure: 4.2.1.8 Payment Gateway

The "My Courses" page: Figure 4.2.1.9 is a personalized area that shows only the courses they have paid for. A thorough description of each course is given on this page, together with links to the modules and course materials.

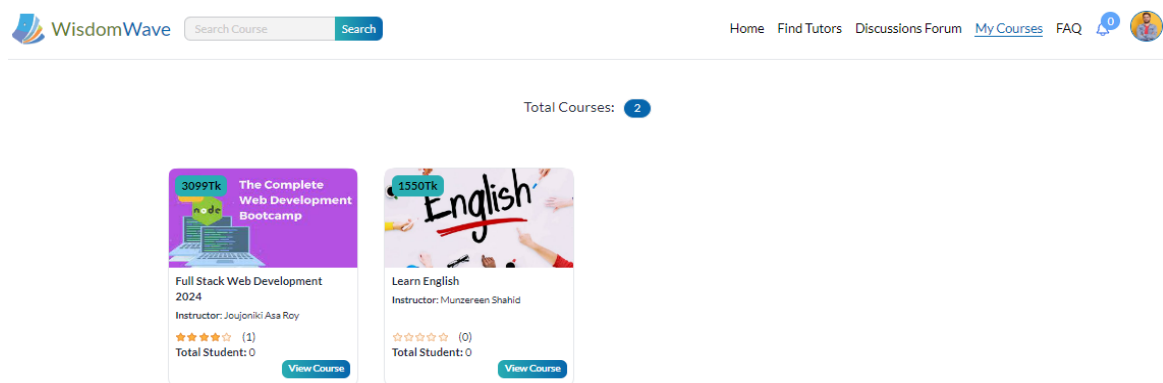
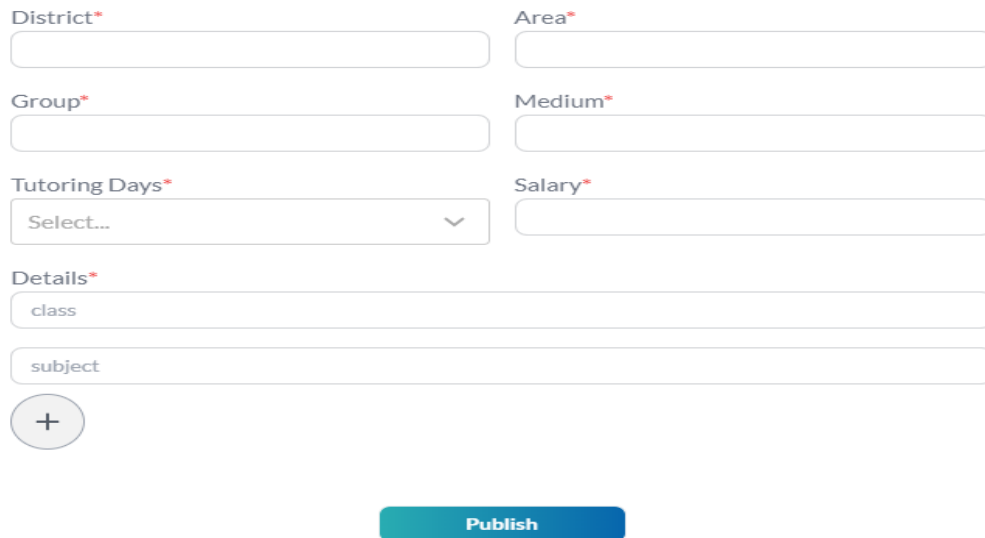


Figure: 4.2.1.9 My Courses Page

The "Create Tuitions" page: Figure 4.2.1.9 is designed to create a tuition if needed. Students can create a tuition for one class only once.

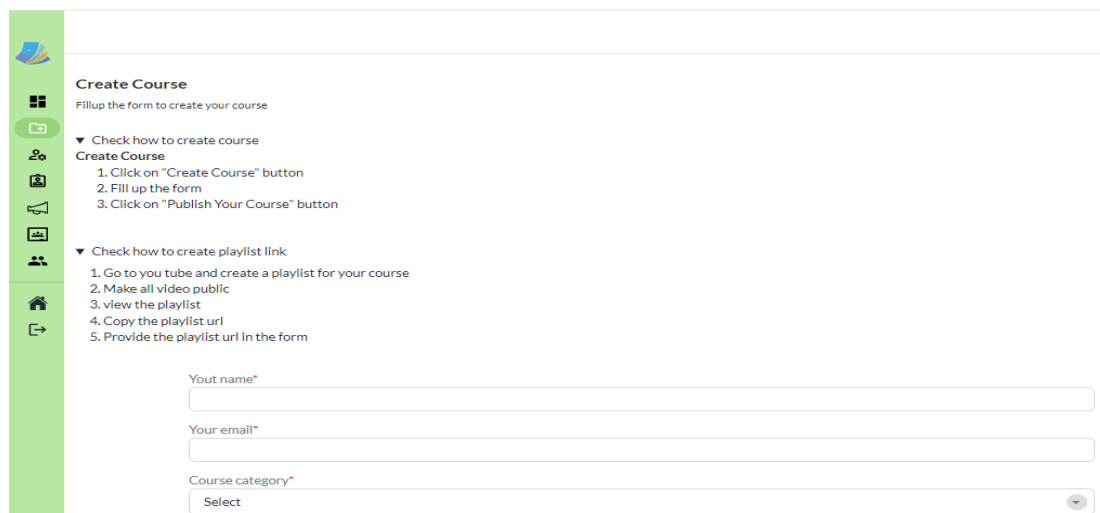


The form for creating a tuition page includes the following fields and controls:

- District***: Text input field.
- Area***: Text input field.
- Group***: Text input field.
- Medium***: Text input field.
- Tutoring Days***: Dropdown menu with "Select..." and a downward arrow.
- Salary***: Text input field.
- Details***: Section header.
- class**: Text input field.
- subject**: Text input field.
- +**: A circular button with a plus sign.
- Publish**: A blue button.

Figure: 4.2.1.10 Create Tuition Page

The "Create Course" page: In Figure 4.2.1.11 instructors can create new courses if needed. This page includes a form for the course description.



The "Create Course" page features a green sidebar with navigation icons and a main content area. The sidebar includes icons for a dashboard, a selected course icon, a person, a megaphone, a calendar, a group of people, a home icon, and an external link icon. The main content area is titled "Create Course" and includes the following elements:

- Create Course**: Section header.
- Fillup the form to create your course**: Instructional text.
- ▼ Check how to create course**: Expandable section.
- Create Course**: Sub-section header.
- 1. Click on "Create Course" button**: Step 1.
- 2. Fill up the form**: Step 2.
- 3. Click on "Publish Your Course" button**: Step 3.
- ▼ Check how to create playlist link**: Expandable section.
- 1. Go to you tube and create a playlist for your course**: Step 1.
- 2. Make all video public**: Step 2.
- 3. view the playlist**: Step 3.
- 4. Copy the playlist url**: Step 4.
- 5. Provide the playlist url in the form**: Step 5.
- Yout name***: Text input field.
- Your email***: Text input field.
- Course category***: Dropdown menu with "Select" and a downward arrow.

Figure: 4.2.1.11 Create Course Page

The "Manage Course" page: Figure 4.2.1.12 displays all courses created by the instructor with options to "Edit course", "Delete course", and "Create quiz". It helps the instructor control the page by editing, deleting, and creating a quiz for the course. Instructors must organize classes with a proper title of the classes. This title has to be constant when creating a quiz.

Course Management

Update or delete your course

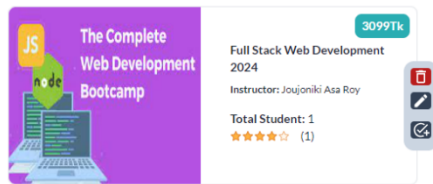


Figure: 4.2.1.12 Manage Courses Page

The "Announcements" Page: In Figure 4.2.1.13, instructors can post updates, important news, and helpful reminders for their students on the "Announcements" page. This feature helps keep students informed about course-related news, upcoming events, and any changes to schedules or content.

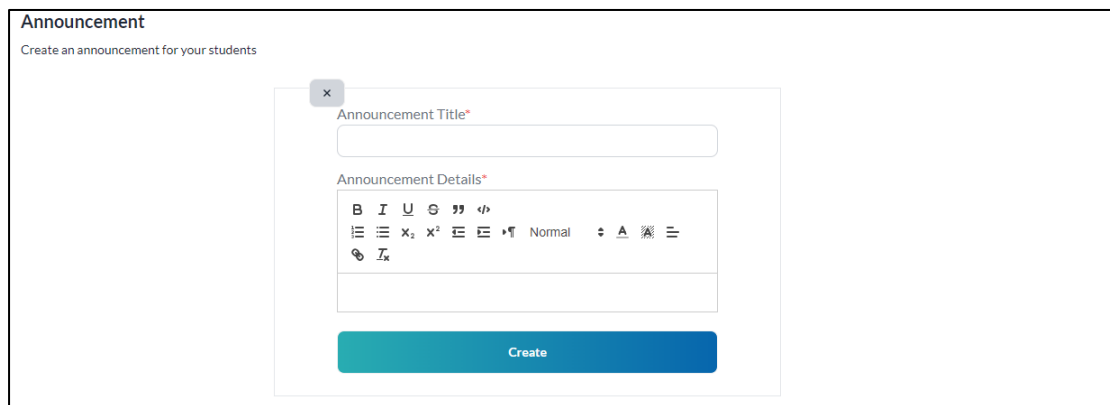


Figure: 4.2.1.13 Announcement Page

The "Manage Classes" page: Figure 4.2.1.14 is designed to control and manage live classes for a course by giving a proper title and virtual class link.

Manage Classes

View and manage your classes

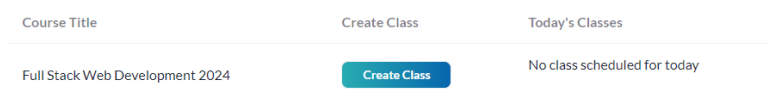


Figure: 4.2.1.14 Manage Classes Page

4.2.2 Implementation of Back-end Design

Our e-learning platform's back-end architecture makes use of Express, Node.js, and Mongoose in conjunction with MongoDB to enable scalable and effective development. The robust JavaScript runtime Node.js offers the basis for developing server-side apps that are scalable and quick to develop. Express is a versatile Node.js online application framework that offers a wide feature set for both web and mobile applications, making it easier to construct reliable APIs.

Mongoose is a sophisticated Node.js tool for MongoDB object modeling that facilitates the management of data relationships, schema validation, and object mapping from code to MongoDB representation. NoSQL databases like MongoDB are flexible and scalable, which makes them perfect for managing a wide range of data types and substantial amounts of data.

These technologies work together to create a seamless back-end architecture that meets our e-learning platform's changing requirements. Mongoose and MongoDB enable effective data storage and retrieval, and Node.js and Express guarantee a high-performance server environment. This architecture makes it possible to integrate different functionalities seamlessly, which helps the platform achieve its objective of providing a thorough and intuitive learning experience.

Here are the requests and responses of all the APIs using Postman, an open-source platform for testing requests and responses

Sign Up API: This 4.2.2.1 figure shows the request and response for creating a user.

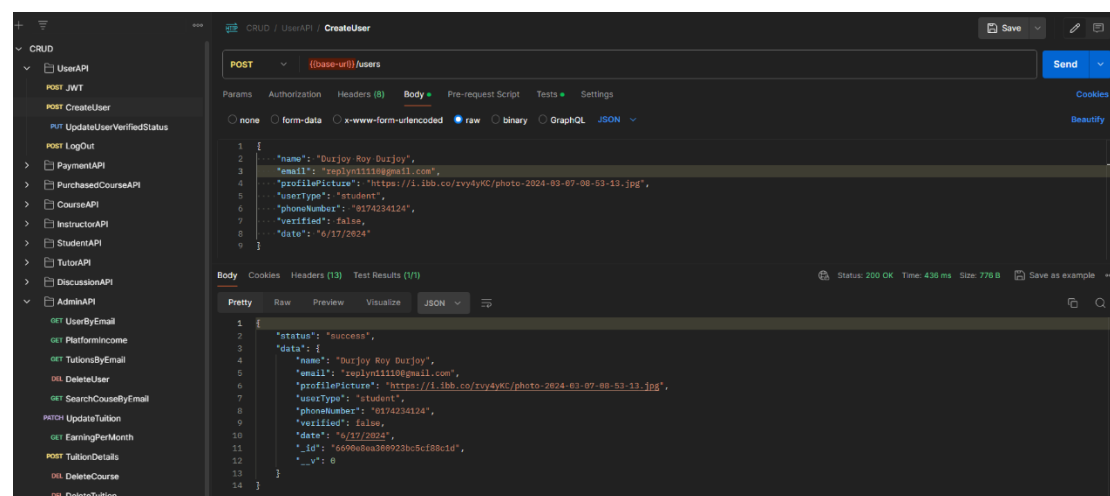


Figure: 4.2.2.1 Sign Up API

Update Verified Status API: This 4.2.2.2 figure shows the request and response for updating a user's verified status.

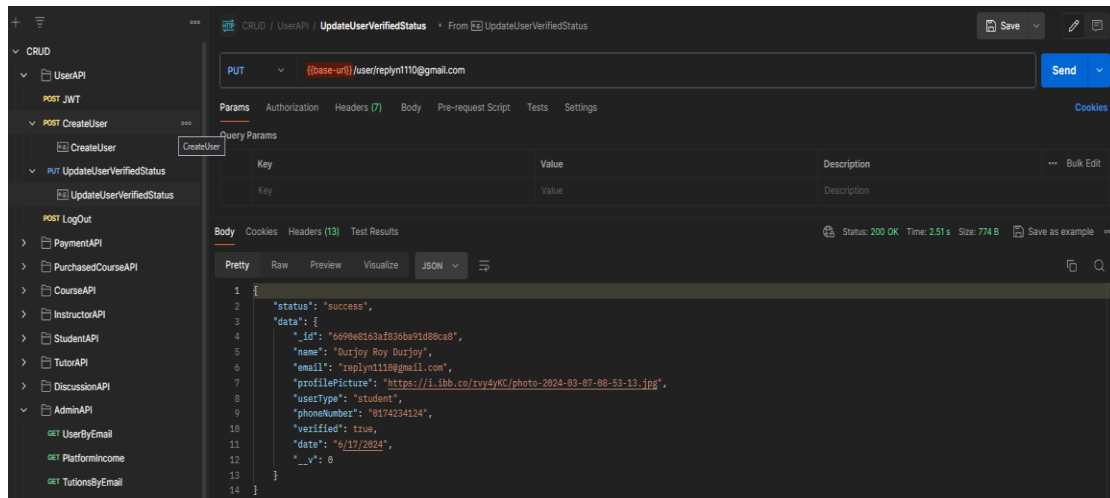


Figure: 4.2.2.2 Update Verified Status API

Create Course API: This 4.2.2.3 figure shows the request and response for creating a course.

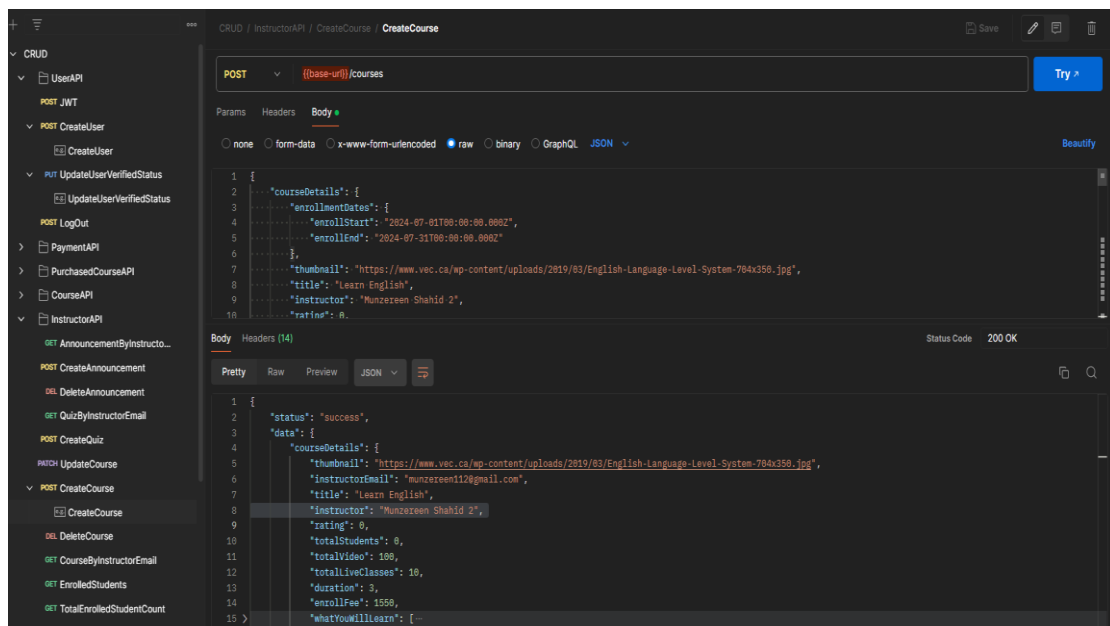


Figure: 4.2.2.3 Create Course API

Update Course API: This 4.2.2.4 figure shows the requests and response for updating a course.

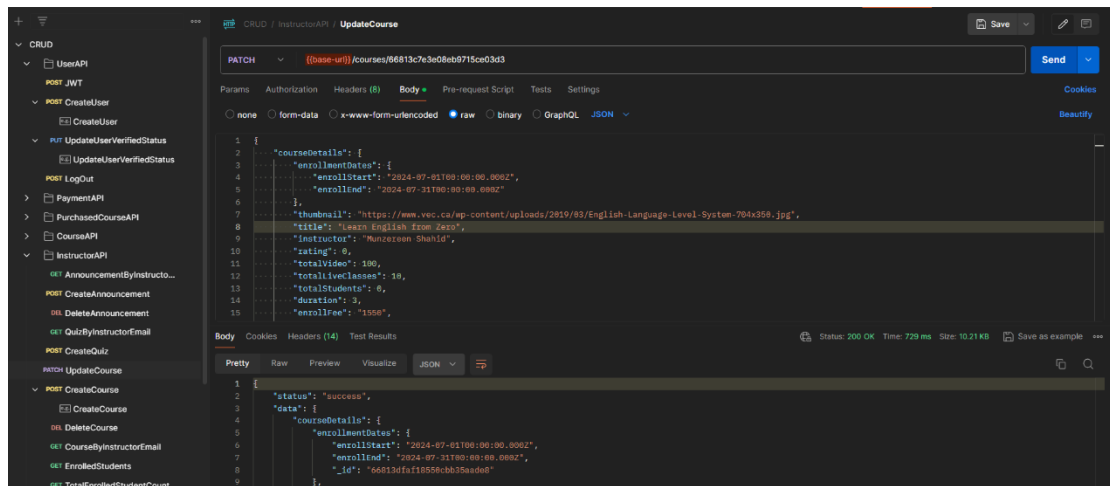


Figure: 4.2.2.4 Update Course API

Delete Course API: This 4.2.2.5 figure shows the request and response for deleting a course.

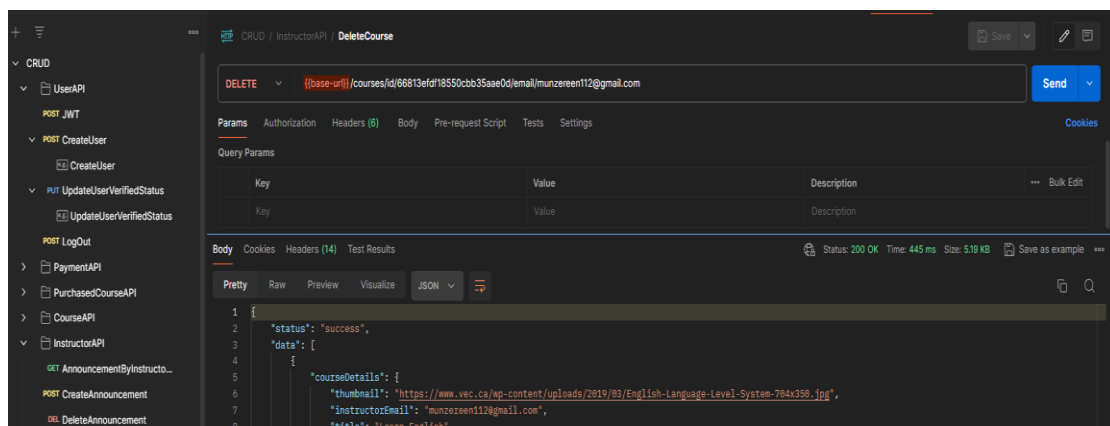


Figure: 4.2.2.5 Delete Course API

Create Class API: This 4.2.2.6 figure shows the request and response for creating a class for a specific course.

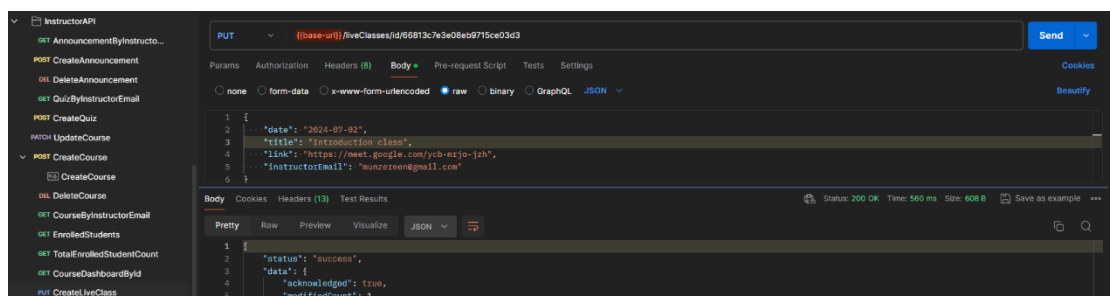


Figure: 4.2.2.6 Create Class API

Create Tutor Profile API: This 4.2.2.7 figure shows the request and response for creating a Tutor Profile.

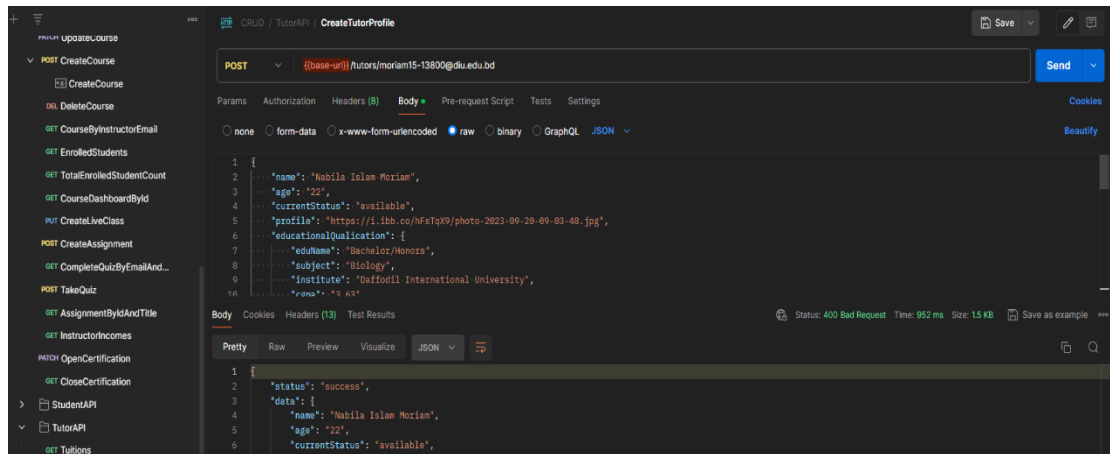


Figure: 4.2.2.7 Create Tutor Profile API

Create Tuition API: This 4.2.2.8 figure shows the request and response for creating a tuition.

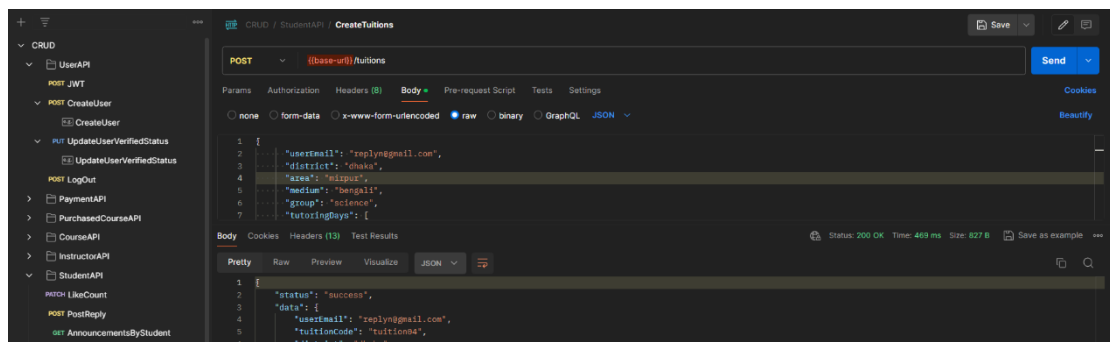


Figure: 4.2.2.8 Create Tuition API

Payment Gateway API: This 4.2.2.9 figure shows the request and response for buying a course

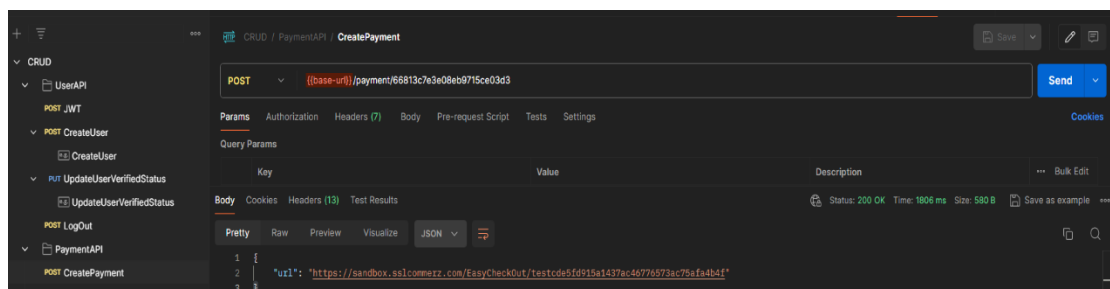


Figure: 4.2.2.9 Payment Gateway API

4.3 System Testing

System testing, which tests the entire integrated software application, is a crucial stage in the software development lifecycle. Evaluating the end-to-end system specifications and confirming that the system satisfies both functional and non-functional requirements are the goals of system testing. During this stage, any bugs

that need to be fixed before deployment are found and the system's overall functionality is confirmed.

Once these tests are completed, it declares that the website is prepared for release. I tried these on several PCs, tablets, and phones. Finally, conducted a study to determine the outcomes and advantages of usability testing:

- The best user interface for communication.
- Users find it easy to use.
- Searching and navigating the system is simple.
- Users are more likely to approve applications.
- Excellent application quality across the board.

The evaluation Of the test case are given below,

Table: 4.3.1 Test Case Evaluation

Test Cases	Test Input	Expected Outcome	Obtained Outcome	Passed /Failed	Testing Period
1. Join as a Student	Join with a valid email	Please check your email to verify	Please check your email to verify	Passed	30-06-2024
2. Join as a Tutor	Join with a valid email	Please check your email to verify	Please check your email to verify	Passed	30-06-2024

3. Join as an Instructor	Join with a valid email	Please check your email to verify	Please check your email to verify	Passed	30-06-2024
4. Login	Login with verified email	Successfully Logged In!	Successfully Logged In!	Passed	30-06-2024
5. Login	Login without email verification	Verify before login	Verify before login	Passed	30-06-2024
6. Login	Login with an invalid credential	Failed to Log In!	Failed to Log In!	Passed	30-06-2024
7. Login	Login with a valid credential	Successfully Logged In	Successfully Logged In	Passed	30-06-2024
8. Create Course	Create a new course	Course Added Successfully	Course Added Successfully	Passed	30-06-2024
9. Rating	Give a rating for the first time	Rated the course successfully	Rated the course successfully	Passed	30-06-2024
10. Rating	Give a rating in the same course, which was	You already rated this course	You already rated this course	Passed	30-06-2024

	already rated				
11. Create a Tutor Profile	Create a tutor new profile	Profile created successfully	Profile created successfully	Passed	30-06-2024
12. Create a Tutor Profile	Create an existing tutor profile	Profile already created	Profile already created	Passed	30-06-2024
13. Log out	Remove session and return to home	Successfully Logged Out	Successfully Logged Out	Passed	30-06-2024

4.4 Summary

To create a user-centric application, a collaborative approach is used in the construction of the front-end and back-end design for the web-based e-learning platform. The platform strives to provide a smooth and interesting learning experience for Students, Tutors, Instructors, and Admin by utilizing best practices and contemporary technologies. The platform will adapt to suit the changing demands of its users through constant observation, feedback, and enhancements.

CHAPTER 5

Impact on Society, Environment, and Sustainability

5.1 Impact on Life

Flexibility is also another important advantage. This platform accommodates different learning styles and life commitments by enabling students to access courses and resources at their own time and convenience. Those who find it difficult to follow a strict schedule, such as parents and working professionals, would benefit from this flexibility. It also encourages lifelong learning and skill improvement. It provides a large selection of courses in many different subjects, allowing people to retrain or upskill in response to shifting employment trends. This is important when businesses are changing quickly due to technological improvements.

5.2 Impact on Society & Environment

The implementation of "WisdomWave - Design and Development of an E-Learning Platform" has a significant positive impact on society and environment. E-learning is highly praised nowadays since it offers the flexibility to learn remotely. We believe that our learning platform will benefit society.

It can impact positively to the society in several ways:

- Enhanced class Efficiency: E-learning is more efficient rather than the traditional learning process.
- Enhanced Interactive Learning: It is more beneficial to conduct virtual classes via our learning platform rather than conducting loud class discussions in a traditional classroom.
- Reduces educational disparities by providing equal learning opportunities
- Increased Accessibility for Special Needs: makes use of technology to improve each educational experience for all students
- By taking online quizzes, anyone can quickly determine their level of expertise in a given area.
- Instead of going outside, they simply browse our websites for the courses they want to take, and they can easily purchase them. it helps them save time.

It can impact positively to the environment in several ways:

- **Reduction in Carbon Footprint:** E-learning reduces air pollution and greenhouse gas emissions by reducing commuting.
- **Reduction of Sound Pollution:** E-learning reduces sound pollution as it conducts virtual classes.
- **Minimized Use of Physical Resources:** By providing online learning materials, e-learning reduces the amount of energy used to produce paper and the amount of deforestation.
- **Decreased Energy Consumption:** E-learning reduce the heating, cooling, and equipment power
- **Reduced Need for Physical Infrastructure:** By decreasing the demand for new Reduces educational facilities, e-learning protects the environment and lowers pollution
- **Waste Reduction:** It produce less waste than traditional classroom supplies.

5.3 Ethical Aspects

The ethical dimensions of online education cover a multitude of factors that affect students, instructors, and admin in equal measure. These are some important e-learning ethical considerations:

- **Privacy and Data Security:** In e-learning, it's imperative to protect student privacy and personal data. It ensures user data protection.
- **Intellectual Property Rights:** Respect for intellectual property rights is essential in e-learning environments. When using materials made by others are required to respect copyright rules and give correct credit to the creators of the information.
- **Education Quality:** High-quality instruction that satisfies established requirements and learning objectives is provided via e-learning. Ensuring that courses are accurate, current, and pertinent to the requirements of the user is one of the ethical considerations
- **E-learning platforms exhibit cultural sensitivity and inclusivity** by acknowledging and valuing the diversity of cultures.

By addressing these ethical issues, e-learning can ensure that it helps students and society at large while avoiding potential ethical conundrums and upholding the values of justice, integrity, and accountability.

5.4 Sustainability Plan

Creating a sustainable plan for "WisdomWave - Design and Development of an E-Learning Platform" means putting strategies in place to guarantee long-term sustainability, lessen environmental effects, and encourage moral behavior. Here is an outline:

❖ **Environmental Sustainability:**

- **Reducing Carbon Footprint:** Take steps to reduce the carbon footprint associated with online learning, like encouraging students to learn remotely
- **Optimal Resource Utilization:** To cut down on energy use and greenhouse gas emissions, make the most of server utilization and use energy-efficient technologies.

❖ **Responsible Data Handling:**

- **Privacy Compliance:** Consistently updating privacy rules and implementing strong data security safeguards ensure that user data is protected.
- **Data minimization:** User security and privacy are protected by gathering just the necessary user data and enforcing strict storage guidelines.

❖ **Social Responsibility:**

- **Improved Accessibility:** Continues improvement in accessibility guarantee inclusivity for users with a range of learning requirements
- **Community Engagement:** We may improve social effect by supporting local educational programs and encouraging cultural diversity on our platform.

5.5 Summary

This sustainability plan aims that “WisdomWave” has a positive impact on education and society at large by guiding it towards ethical excellence, environmental stewardship, and continuous growth.

CHAPTER 6

Conclusion and Future Works

6.1 Conclusions

The development of the online learning platform addresses the diverse educational needs of four primary user categories: Tutors, Students, Instructors, and Admin. Tutors can create detailed profiles to attract potential students, offering personalized tutoring services and enhancing the accessibility and effectiveness of learning. Students can purchase and enroll in courses, participate in live classes, seek personalized tutoring, and post tuition requests to find suitable tutors. Additionally, they can engage in discussions to seek help. Instructors have the tools to create and manage course content, including quizzes, announcements, and live class links, ensuring that educational material remains current and relevant. The role of admin is crucial, as they maintain the quality and integrity of the platform by managing users, and overseeing course content, tuitions, and discussions. Despite technological difficulties, limited resources, and the need for extensive testing, the platform's robust design and comprehensive functionalities make it a valuable tool for modern education. Future enhancements, such as improved search capabilities, better user interface designs, and more personalized learning experiences, can further increase the platform's usability and effectiveness. The successful integration of these features marks a significant step toward creating a more accessible and interactive online educational environment, with ample scope for growth and enhancement in the future.

6.2 Further Suggested Works

This project has a lot of opportunities for growth in the future. This platform could be improved in a few ways to make it even more helpful and user-friendly.

- I will implement a direct chatting system for tutors and students.
- I will implement a leaderboard for each course to track the performance of student
- I will implement a virtual teaching platform for tutors.
- I will use cutting-edge security procedures to safeguard user information while keeping up with the constantly changing cybersecurity risks.

"WisdomWave" can gain even more value and usability by adding new features and addressing unsolved problems.

6.3 Limitations

Throughout the project's development, I have encountered numerous challenges. While developing this project, I encountered numerous challenges even though I made an effort to overcome the majority of them. Even though I made an effort to get past the most of these challenges, there are still others that I can't seem to resolve because of time, money, technology, or lack of experience.

Some limitations are given below:

- I could not buy an SSL certificate, since I couldn't use HTTPS cookies on my website.
- I could not use the original sslcommerz gateway API due to financial constraints.
- I could not implement the real-time notification system.
- I could not use the video hosting service due to financial constraints
- I developed this project over six months, and I had never worked on a project this size before.

Reference

- [1] Udemy, available at <<<https://www.udemy.com/>>>, last accessed on 29/09/2023
- [2] 10 Minute School, available at <<<http://10minuteschool.com/>>>, last accessed on 29/09/2023.
- [3] Coursera.com, available at << <https://www.coursera.org/>>>, last accessed on 29/09/2023.
- [4] Khan Academy, available at <<<https://www.khanacademy.org/>>>, last accessed on 29/09/2023
- [5] Study Press, available at <<<https://studypress.org/>>>, last accessed on 20/01/2024
- [6] What is the history of e-learning, available at <<<https://e-student.org/history-of-e-learning/>>>, last accessed on 20/01/2024
- [7] EDX, available at << <https://www.edx.org/>>>, last accessed on 19/01/2024.
- [8] Ahmad, F., Baharom, F. and Husni, M., 2012. Agile development methods for developing web application in small software firms.
- [9] Karthick, M.M., ROLE OF E-LEARNING PLATFORMS IN EDUCATION DURING THE PANDEMIC. EMPOWERING TEACHER EDUCATION AND IT VISION BY 2021, p.129.
- [10] Qiu, R., 2020. Udemy: blended and e-learning for transforming teaching and learning. Anticipating and Preparing for Emerging Skills and Jobs: Key Issues, Concerns, and Prospects, pp.215-220.
- [11] Elsaadany, A. and Abbas, K., 2016, May. Development and implementation of e-learning system in smart educational environment. In 2016 39th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO) (pp. 1004-1009). IEEE.
- [12] Mor, E., Minguillón, J. and Santanach, F., 2007, March. Capturing user behavior in e-learning environments. In International Conference on Web Information Systems and Technologies (Vol. 2, pp. 464-469). SCITEPRESS.

Appendix A

Course Outcomes, Complex Engineering Problems (EP) and Complex Engineering Activities (EA) Addressing

Title: WISDOMWAVE: DESIGN AND DEVELOPMENT OF AN E-LEARNING PLATFORM

Student ID: 201-15-13928

CO Description for FYDP

CO	CO Descriptions	PO
Phase -I		
CO1	Integrate recently gained and previously acquired knowledge to identify a web-based e-learning platform problem for the Final Year Design Project (FYDP)	PO1
CO2	Analyze different aspects of the goals in designing a solution for this FYDP	PO2
CO3	Explore diverse problem domains through a literature review, delineate the issues, and establish this goals for the FYDP	PO4
CO4	Perform economic evaluation and cost estimation and employ suitable project management procedures throughout the development life cycle of the FYDP	PO11
Phase -II		
CO5	Design and develop technical solutions and system components or processes that meet specified requirements, ensuring compliance with public health and safety standards, as well as considering cultural, socioeconomic, and environmental factors in this FYDP	PO3
CO6	Choose and apply appropriate methodologies, resources, and contemporary engineering and IT technologies to address complex engineering processes, encompassing prediction and modeling, while adhering to relevant constraints in this FYDP	PO5
CO7	Analyze societal, health, safety, legal, and cultural considerations, along with associated responsibilities, in the context of professional engineering practice and the resolution of this problem, employing logical reasoning guided by contextual understanding.	PO6

CO8	Comprehend and evaluate the enduring sustainability and impact of professional engineering endeavors in addressing intricate engineering challenges within social and environmental frameworks.	PO7
CO9	Implement ethical principles and adhere to professional standards and norms in this FYDP	PO8
CO10	Capable of operating proficiently both individually and as a team member or leader across diverse teams and interdisciplinary settings in this FYDP.	PO9
CO11	Proficiently communicate with the engineering community and broader society regarding complex engineering endeavors, including the ability to comprehend and generate comprehensive reports and design documentation, as well as provide and receive clear instructions throughout this FYDP.	PO10
CO12	Acknowledge the importance of self-directed and life-long learning within the evolving landscape of technology, and possess the readiness and capability to engage in lifelong learning endeavors.	PO12

Addressing CO (1 to 8), Knowledge Profile (K), Attainment of Complex Engineering Problems (EP), and Attainment of Complex Engineering Activities (EA)

Addressing CO (1 to 8), Knowledge Profile (K), Attainment of Complex Engineering Problems (EP):

SN	EP Definition	Attainment	CO	Justification (with Knowledge Profile)	References
1.	EP1: Depth of Knowledge required	Yes	CO1, CO2, CO3, CO5, CO6, CO7 and CO8	To demonstrate the implementation of fundamental engineering principles, the e-learning project covers Engineering Fundamentals (K3) through an exploration of process modeling, data design, and front-end programming. By combining front-end and back-end design, interaction design, and user experience (UX), it addresses Specialist Knowledge (K4). Front-end technologies used are HTML, CSS, and full-stack development uses the MERN stack (MongoDB, Express.js, React.js, and Node.js). Critical design needs such user interface, safety, flexibility, modification, compatibility, accessibility, and stability are integrated into this e-learning project to apply Engineering Practice & Design (K5). The project addresses engineering practice & technology (K6) by employing HTML, CSS, React JS, JavaScript, Node JS, and Express JS. This ensures that the trip management system is stable, user-focused, and compliant with fundamental design ideas.	Page no: [12-18], Section: [3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.3] Page no: [23-34], Section: [4.2.1, 4.2.2] Page no: [12-22], Section: [3.1, 3.2, 3.3, 3.4] Page no: [23-37], Section:

					[4.1, 4.2, 4.2.1, 4.2.2, 4.3]
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				The project obtains research literature K8 studied similar websites.	Page no: [6-10], Section: [2.2, 2.3]
2.	EP2: Range of Conflicting Requirements	Yes	CO2, and CO7	The e-learning initiative addresses multiple difficulties in confronting Engineering Practice (EP-2). These include combining different features while maintaining a top-notch user experience and striking a balance between functionality and security.	Page no: [2-3] Section: [1.5]
3.	EP3: Depth of analysis required	Yes	CO2, and CO6	In order to address EP-3 , the project gives priority to modern front-end design for improved user experience and back-end development.	Page no: [23-34], Section: [4.2.1, 4.2.2]
4.	EP4: Familiarity of Issues	Yes	CO8	By incorporating travel management data into development, streamlining procedures, and improving user experience, the project satisfies EP-4 .	Page no: [6-10], Section: [2.2, 2.3]
5.	EP5: Extends of application codes	No	CO5	N/A	N/A

6.	EP6: Extends of stakeholders involved and conflicting requirements	No	CO8	N/A	N/A
7.	EP7: Interdependence	Yes	CO5	By tackling complex issues at every stage of development, this project satisfies CEP and EP-7 requirements. This all-encompassing strategy ensures a solid, safe, and intuitive learning environment.	Page no: [23-34], Section: [4.2.1, 4.2.2]

Addressing CO11 with Complex Engineering Activities (EA) [Some or all of the following]:

SN	EA Definition	Attainment	CO	Justification	References
1.	EA1: Range of resources	Yes	CO11	This project makes use of numerous programming languages, frameworks, databases, and tools.	Page no: [18-21], Section: [3.4]

2.	EA2: Level of interaction	No		N/A	N/A
3.	EA3: Innovation	No		N/A	N/A
4.	EA4: Consequences for society and the environment	Yes		In order to promote societal well-being and environmental stewardship, this project prioritizes social impact and environmental sustainability	Page no: [38-40], Section: [5.1, 5.2, 5.4]
5.	EA-5: Familiarity	Yes		The Comparative Analysis for "WisdomWave - Design and Development for an E-learning platform" evaluates existing websites and highlights WisdomWave's unique features, customer engagement, and security. This enhances market knowledge and helps with strategic decision-making for improved value proposition and competitiveness.	Page no: [6-10], Section: [2.2, 2.3]

Addressing CO (4, 9, 10, and 12):

SN	COs	Attainment	Justification	References
1	CO4	Yes	By combining cost control, resource allocation, risk reduction, and financial management techniques while upholding quality standards, the project absorbs CO4.	Page no: [18-21], Section: [3.4]
2	CO9	Yes	By prioritizing user privacy, guaranteeing open data management procedures, providing unbiased advice, honoring cultural diversity, and improving accessibility, it upholds ethical norms. These guidelines foster integrity, openness, and trust among all those engaged in the educational process.	Page no: [39], Section: [5.3]
3	CO10	No	N/A	N/A
4	CO12	Yes	During the project's implementation phase, system testing refines the platform for increased efficacy while a variety of testing methodologies and automated frameworks are used to promote lifetime learning.	Page no: [35-37], Section: [4.3]

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