

A SOCIAL MEDIA-BASED EDUCATION PLATFORM: “TIE-UP DIU”

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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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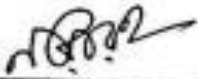
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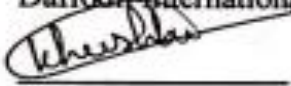
This Project titled “A Social Media-based Education Platform: TIE-UP DIU”, submitted by Md. Muaj Chowdhury to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 14 July 2024

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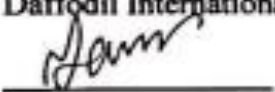
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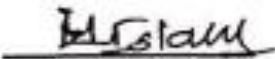
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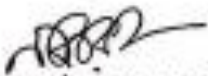
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DECLARATION

I hereby declare that this project has been done by myself under the supervision of **MR. Narayan Ranjan Chakraborty**, Associate Professor and Associate Head, 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.

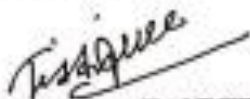
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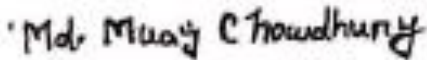
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ABSTRACT

The necessity of robust communication platforms within educational communities has become increasingly important in an era marked by the rapid advancement of technology and the evolution of professional landscapes. An innovative online tool, "TIE-UP DIU," has been specifically developed for the Daffodil International University (DIU) community, which includes students, alumni, and instructors. Its purpose is to facilitate the exchange of information, skill development, and career advancement. By offering a personalized environment for academic collaboration, industry-level training, and research opportunities, this platform addresses the unique requirements of educational groups that are frequently overlooked by conventional social media platforms. "TIE-UP DIU" aspires to become a comprehensive resource center, despite the initial challenges it faces, including the lack of domain hosting and database requirements. The project comprised a comprehensive overview, problem description, objectives, scope, literature review, system design, implementation, and societal impact. By drawing insights from existing platforms and research, it endeavors to reconcile disparities in user experience, functionality, and security, fostering a more inclusive and engaging environment. Utilizing a MERN architecture for backend performance and a user-friendly front end with technologies like Vanilla JavaScript and Daisy UI, the platform supports up to 500 concurrent users effectively. Thorough testing ensures it meets user expectations and handles tension efficiently. Ultimately, "TIE-UP DIU" exemplifies a robust web platform designed to enhance knowledge sharing, skill development, and professional growth within the DIU community, promoting academic and social integration while contributing to societal innovation and economic stability.

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LIST OF ACRONYMS

API	Application Programming Interface
SRS	Software Requirement Specification
JS	Java Script
MERN	MongoDB, Express JS, React, Node JS

CHAPTER 1

INTRODUCTION

1.1 Overview

A robust platform that enables smooth communication among educational groups is becoming more and more necessary in a time of fast technological progress and changing professional environments. “TIE-UP DIU” is intended to be a state-of-the-art online application based on social media platforms, designed especially for the active community of Daffodil International University Teachers, alumni, and current students. This cutting-edge platform seeks to create a comparative atmosphere that promotes information exchange, skill improvement, and career advancement.

1.2 Background and Present State

Due to the effect of social media, it is challenging to retain education in the era of information technology. However, it would be fantastic if an alternative social networking platform served as a learning environment. There are billions of websites in the world today that are attempting to achieve that objective. Similarly, my idea achieves the same goal in a slightly different way by trying to instill a sense of community and immerse Daffodil International University in the vastness of knowledge. It will assist us in staying current with technology and in creating a brighter future.

1.3 Problem Statement

Educational institutions are currently confronted with challenges related to a lack of specialized platforms and a lack of information interchange through official social media websites, where specific components or elements have a considerable influence on students' academic progress. Conventional routes of communication usually fall short of meeting the changing needs of educational communications. Collaboration among DIU academics, alumni, and current students is hampered by the absence of a designated venue. Opportunities for research, information sharing, industry-level training, and programming skills are thereby eliminated.

1.4 Objectives

The goal of "TIE-UP DIU" is to close these gaps and provide a hub for the DIU community to prosper. The idea behind the platform is the possibility of unlocking a plethora of potential via the interaction of educators, former students, and current students. Some of these advancements include improved job prospects, training sessions relevant to the sector, joint research projects, and scholarship opportunities.

The following are the main goals of "TIE-UP DIU":

- Fostering deep ties between DIU instructors, alumni, and present students.
- Establishing a forum for the sharing of academic thoughts, research ideas, and expertise.
- Setting up avenues for seasoned Pharms or IT Companies graduates to receive industry-level mentoring and training.
- Providing chances for journal and research article publication.
- Establishing a welcoming atmosphere for students seeking a scholarship to study overseas.
- Improving career prospects via networking and exposure to business intelligence.

1.5 Scope and Limitation

The "TIE-UP DIU" project entails the creation and deployment of an extensive online application that provides a wealth of resources to the DIU community. The platform will include extensive networking features, easy-to-use interfaces, and areas specifically for problem-solving competitions, pre-industry training, research cooperation, job opportunities, and organizing events. There are certain limitations to this project because it is a planned project. This project is unable to accommodate the substantial database requirements. It is not yet active on the internet since it lacks a domain name and hosting. The lack of understanding regarding numerous database connectivity prevents the creation of social connection and response features.

1.6 Report Organization

This report's type is intended to provide readers with a comprehensive understanding of the "TIE-UP DIU" program. This study's remaining material is organized as follows. **Chapter 1** covers the proposed project brief overview, problem statement, motivation and objectives, project scope and outcome, report organization, and summary. **Chapter 2** covers the study's Literature Review and Gap Analysis, and also a comparison between existing works. Following that, the system design,

requirement analysis, design specification, data collection, project management, and financial analysis are expressed in **Chapter 3**. Implementation, prototype design, and testing are expressed in **Chapter 4**. Simulation results and Result analysis are expressed in **Chapter 5**. How the project impacts society and the environment is briefly described in **Chapter 6**. Finally, the conclusions and the future work with limitations are briefly described in **Chapter 7**. Lastly, the References are shown for the authenticity of the report information.

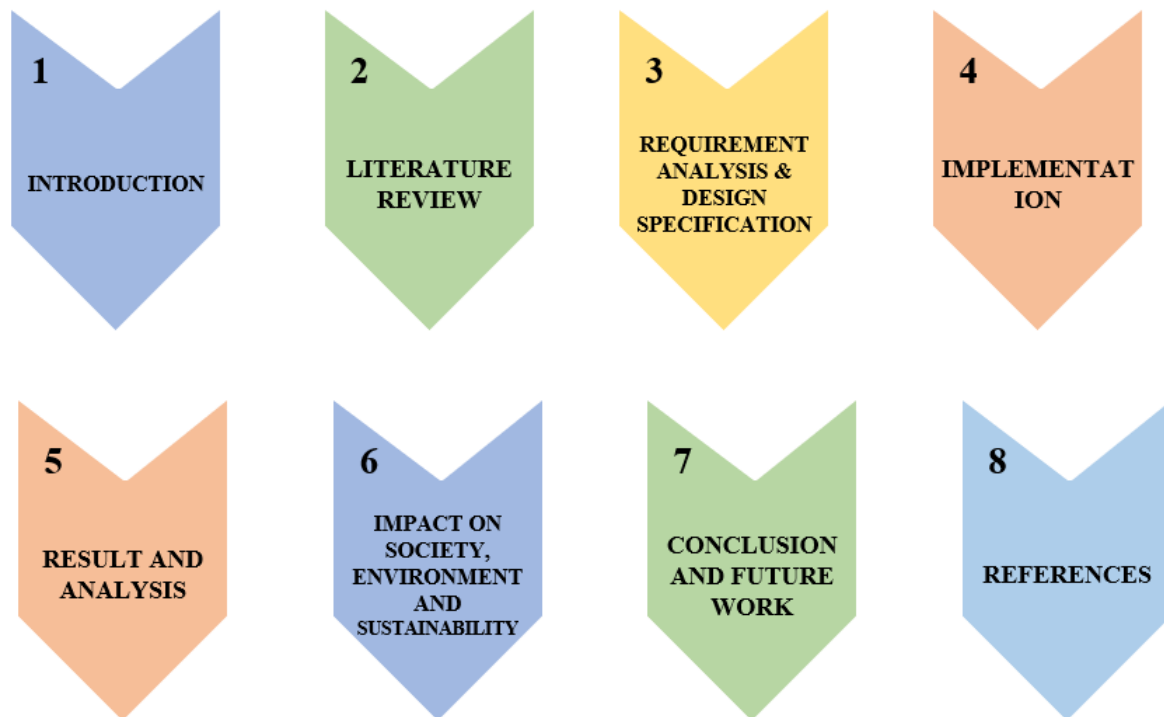


Figure 1.6.1: Report Organization

1.7 Summary

In the current era of swift technological progress, educational groups need a strong communication platform. An inventive online tool called "TIE-UP DIU" is designed with the Daffodil International University (DIU) community—teachers, alumni, and students—in mind. It seeks to promote career growth, skill improvement, and information exchange. "TIE-UP DIU" offers a specialized environment for academic cooperation, industry-level training, and research opportunities, while standard social media struggles to suit educational demands. The platform aims to improve employment possibilities through networking, sharing expertise, and building relationships within the DIU community. Though the project is planned and has some constraints at the moment,

including database needs and no domain hosting, it aims to offer a complete resource hub. The paper finishes with future work and references and covers the project's overview, problem description, objectives, scope, literature evaluation, system design, implementation, and societal effect.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

A thorough grasp of internet platforms that link educational groups is provided by the literature analysis. It draws attention to the advantages of alumni-student networks for information exchange, teamwork, and career advancement. "TIE-UP DIU" is designed using insights into research possibilities, difficulties, and solutions from the majority of current literature. The sheds light on effective alumni engagement strategies while also exploring the difficulties encountered by comparable platforms. It provides insightful information on privacy issues, user involvement, and striking a balance between social media and academic pursuits. "TIE-UP DIU" seeks to capitalize on these insights by utilizing pre-existing solutions and comprehending the influence on community strength. This will enable the development of a customized platform that skillfully combines industry-level training, cooperative research, and a thriving learning environment for DIU's stakeholders.

2.2 Related Works

"Somparka.com [1]" attempts to create an alumni community similar to "TIE-UP DIU," however it has both usability and functional problems. Imparting best practices from popular networks such as "LinkedIn [2]" potential improvements might be to emphasize business networking, bolster security and authentication, expedite registration, enhance user and business profiles, and incorporate learning and development tools. "Somparka.com" has the potential to develop into a more complete and engaging alumni community by integrating tried-and-true tactics from sites like "LinkedIn" which promote relationships, professional development, and lifelong learning. A social learning platform called EducateMe [3] was developed to help people with similar goals network better and engage in cohort-based learning. It comes in an easy-to-use package with networking capabilities, live sessions, video conferencing, learning automation tools, and thorough analytics. Personalized profile pages for showcasing professional information and social networks, as well as a peer review system that promotes interactive and collaborative learning through comments and analysis of members' work, are noteworthy features. Maven [4] is an excellent cohort-based learning platform that enables professionals to provide courses directly to their audience by fusing social networking, online learning, and influencer marketing. Building cohort courses and interacting with a dedicated and accomplished learning community that refines

concepts and knowledge are important features. Other features include earning terms for instructors, who keep 90% of course revenue (less Stripe fees) and retain ownership of their intellectual property and content, as well as a reputation for knowledge and responsibility. Courses featuring experts from big firms may be created in two weeks using basic tools and models. Maven doesn't make its user pricing policy available. Disco [5] is a tool that helps artists create and develop cohort-based, in-person learning communities. Integrating a community platform, learning platform, and monetization options into a single, user-friendly solution, improves efficacy and usability. Users may create branded spaces for collaborative learning, assess progress, track engagement, and construct curricula and group individuals. Disco also offers discounts, referrals, payments, templates, and other ways for community monetization. Additionally, it provides tailored demos that show how the platform may be effectively applied to meet certain user requirements. One platform that users may utilize to establish courses, subscriptions, and groups is called Mighty Networks [6]. It offers communication in real-time, customizable Spaces for a range of applications, and article feeds. Users may sell access to Spaces, hold conferences and masterminds, and strengthen member interactions with features like editable profiles and icebreaker questions. The platform's mobile app, Mighty Pro, gives users early access to features and premium community tools. The Simplify [7] blog provides career advice and recruitment tips. Its primary objectives are to help clients with job search navigation, interview preparation, and resume optimization. The website provides in-depth information on a wide range of topics, including advice on how to write a résumé, strategies for finding a job, information on internships, and help with professional advancement. Along with helpful tools and templates for creating cover letters and boosting LinkedIn profiles, Simplify also aims to facilitate professional growth and speed up the job application process.

2.3 Comparison between existing works

This comparison highlights a brief description of each project motive it also includes LinkedIn which is also a social media-based platform based on job seekers, professions, and businesses, it also includes the pros and cons of Somporka.com. As they are quite similar apps like “TIE-UP DIU” that’s why the comparison is made between the three to identify the exact point of view.

Table 2.1 Comparative analysis with previous work

S L N o	Criteria	“Somporka.com” https://somporka.com/login/	“LinkedIn” https://bd.linkedin.com/	“TIE-UP DIU”
1.	Target Audience	Alumni only	Professionals, Job Seekers, Businesses	Alumni, Teachers, Current students
2.	Event Management	No event launched	Networking and Professional Events	Comprehensive event support
3.	User Authentication	Issues with Login Authentication	Strong Authentication and security	Seamless and secure user authentication
4.	Registration & Password	Registration and password issue	Straightforward registration process	Smooth registration with validation and password recovery
5.	About us section	Lack of specific motives	Detailed company and user profiles	Clearly defined objectives and motivation
6	Learning Environment	Not specified	Professional networking and learning	Outstanding learning environment
7.	Activity focus	Limited activity in job placement	Networking, Job opportunities, Learning	Emphasis on job opportunities and research

2.4 Open Issues

The viability of “TIE-UP DIU” depends on filling up these gaps as it aims to offer a more, complete and functional platform than the noted drawbacks of “Somporka.com”. The drawbacks are pointed out below-

Target Audience Diversity:

- “Somporka.com” is dedicated to alumni alone
- “TIE-UP DIU” seeks to create a more inclusive community by widening the gap between former students and present students and teachers as well.

Functionality and User Experience:

- “Somporka.com” has significant difficulties with registration, login, and password recovery
- “TIE-UP DIU” ensures quick and easy registration and login procedures while aiming for a flawless user experience with enhanced functionality.

Project Objectives Clarity:

- “Somporka.com” in the ‘About us’ section lacks specific goals.
- “TIE-UP DIU” promotes openness and purpose by outlining project goals and motivations in detail in its “About Us” section.

Engagement in Activity:

- “Somporka.com” shows very little activity in crucial areas such as research projects and employment placements.
- “TIE-UP DIU” encourages a more dynamic and engaging platform by actively supporting courses and job placement possibilities.

Authentication and Security:

- “Somporka.com” struggles with issues related to authentication
- “TIE-UP DIU” prioritizes robust user authentication by using Google Authentication to protect user information.

2.5 Summary

The literature study offers a thorough comprehension of online learning environments, emphasizing the advantages of alumni-student networks for knowledge sharing, collaboration, and professional growth. "TIE-UP DIU" is designed to balance social and academic activities while tackling difficulties like user engagement and privacy. It is built based on insights from previous research. The evaluation finds best practices and places for development by looking at sites like Somparka.com, LinkedIn, EducateMe, Maven, Disco, Mighty Networks, and Simplify. Based on a comparative study, "TIE-UP DIU" seeks to close gaps in target audience diversity, functionality, user experience, project objectives, activity engagement, and security to provide a more inclusive, functional, and engaging platform. The platform's success hinges on resolving the issues that other comparable platforms have raised, as well as building a welcoming, community-building atmosphere for DIU stakeholders that will eventually lead to better research, collaboration, and job prospects.

CHAPTER 3

REQUIREMENT ANALYSIS AND DESIGN SPECIFICATION

3.1 Overview

A successful development process relies on a well-planned methodology. “TIE-UP DIU” is a social media-based education platform that includes both functional and non-functional requirements. Analyzing and developing this proposed project requires requirement collection from users and analysis of them, based on the analysis design and development process will be implemented along with a comprehensive testing phase.

3.2 System Design

The following figure 3.1 shows the system design of TIE-UP DIU which is designed using the online tool Lucidchart [8].

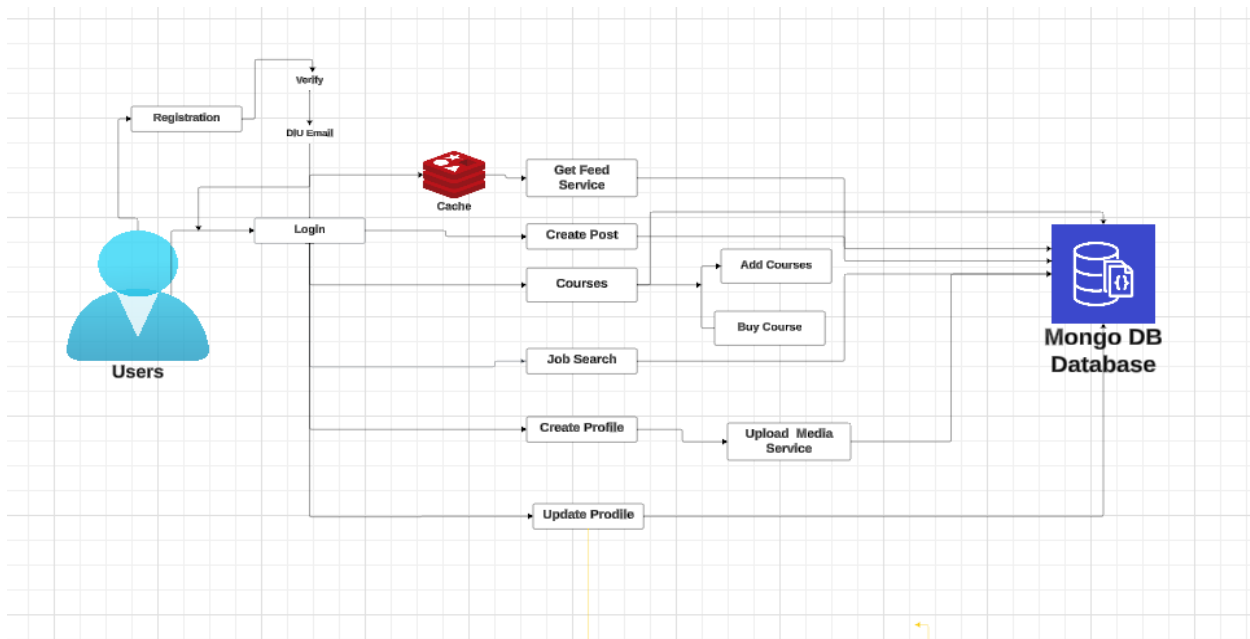


Figure 3.2.1: System Design for TIE-UP DIU

The following Figure 3.2 shows the system Use case diagram of TIE_UP DIU which is also designed using the online tool Lucidchart.

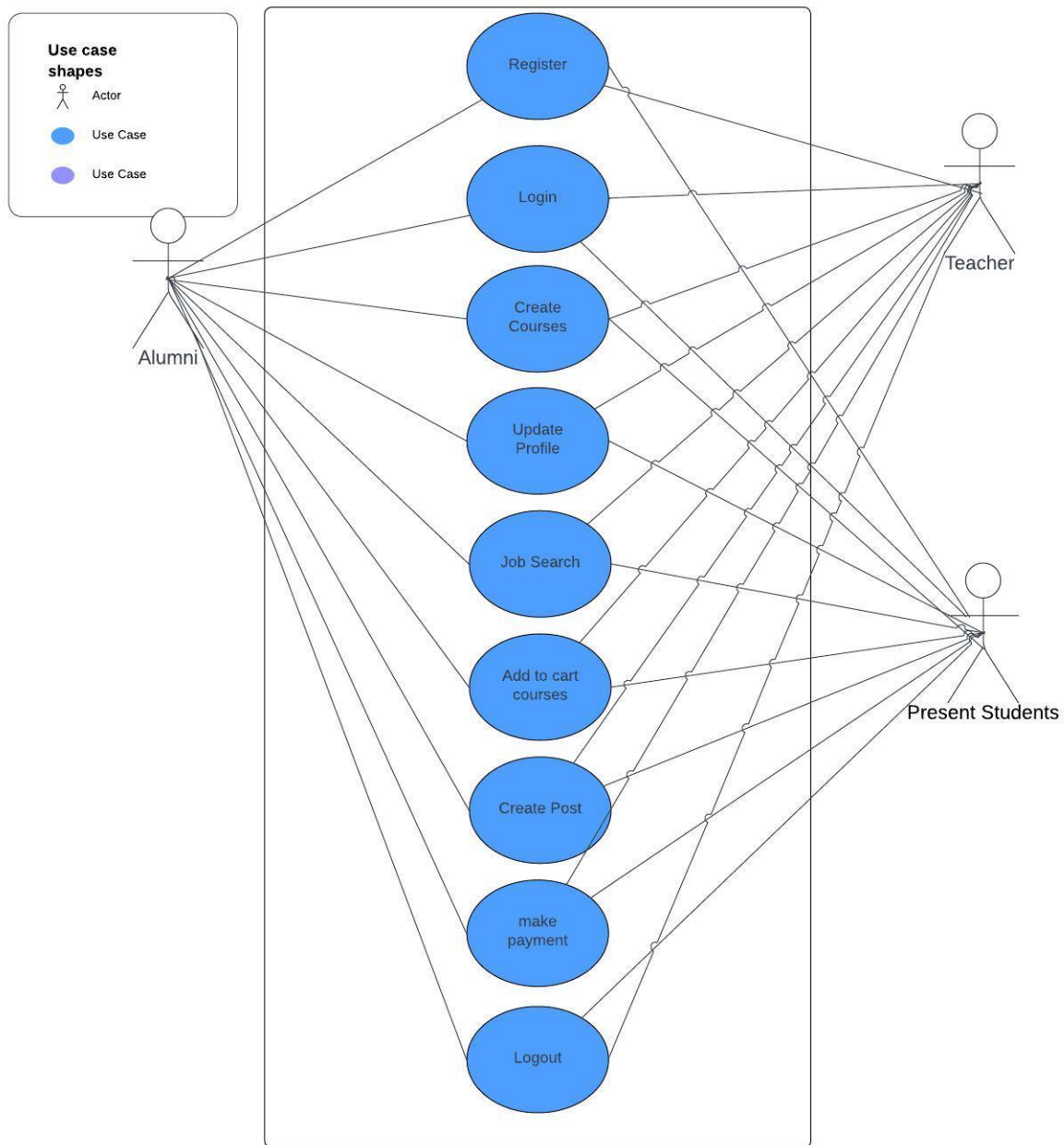


Figure 3.2.2: Use Case Design for TIE-UP DIU

3.3 Software Requirement

A software requirement specification (SRS) is a document that outlines the functions and performance standards for software where some anticipated outcomes are dependent on SRS. A

Software Requirement Specification (SRS) for “TIE-UP DIU” is belloyed-

Introduction:

“TIE-UP DIU” is a dynamic online platform created to transform Daffodil International University’s (DIU) academic community’s communication and cooperation. The platform uses a full stack of technology, including HTML, CSS, Tailwind CSS, JavaScript, React.js, Node.js, and the security capabilities of React Firebase authentication, to deliver a feature-rich, safe, and dynamic user experience. Redux tool integration enhances state management for a smooth user experience, adding value to the MERN stack.

System Overview:

The design of the system is based on the MERN (MongoDB, Express.js, React.js, Node.js) stack, which provides a stable and expandable base. A dynamic and responsive user experience is ensured using React.js, while a visually beautiful and user-friendly interface is created with the help of HTML, CSS, Tailwind CSS, and JavaScript. Google authentication strengthens security protections, guaranteeing effective data handling across the application.

Functional Requirements:

Authorization and Authentication of Users:

- Google authentication is being implemented for safe user registration, login, and password recovery.
- Role-based access control integration allows current students, instructors, and alumni to have varied user rights.

Networking and User Profiles:

- Establishing and maintaining user profiles with customized data.

- Tailwind CSS integration for user experiences that are both aesthetically pleasing and responsive.
- Features for networking that make it easier for current students, alumni, and instructors to connect.

Information Sharing:

- creation of discussion boards and forums to facilitate the sharing of knowledge, intellectual debate, and research ideas.
- JavaScript implementation for dynamic and interactive content.

Studies and Writings:

- A feature for disseminating journals, articles, and research papers.
- React.js components provide opportunities for cooperative research initiatives.

Employment:

- Jobs and career possibilities are listed under the job placement section.
- Section using React.js components that manage Job results for students looking to work remotely, onsite, and hybrid.

Non-functional requirements:

Flexibility:

The scalability of the MERN stack design allows for an expanding user base.

Security:

The security of user data and interactions is improved using React Firebase authentication.

Efficiency:

Optimized JavaScript and Tailwind CSS help to improve UI performance and efficient style.

System design consideration:**Designing User Interfaces:**

- Together, JavaScript, HTML, CSS, Tailwind CSS, and CSS create a visually appealing and responsive user experience.

Design of Databases:

- The MERN stack integrates MongoDB for scalable and effective data storage and retrieval.

Architecture on the Server Side:

- The server-side design is made possible by Express.js and Node.js, which provide smooth communication between the client and server components.

I have collected user requirements from users where they share their functional and non-functional requirements and features also through Google Forms. I have divided them into five segments. They are –

- Count of Functional and Non-Functional Requirements
- Count Of the Department
- Count of role in Daffodil
- User Feature Requirements

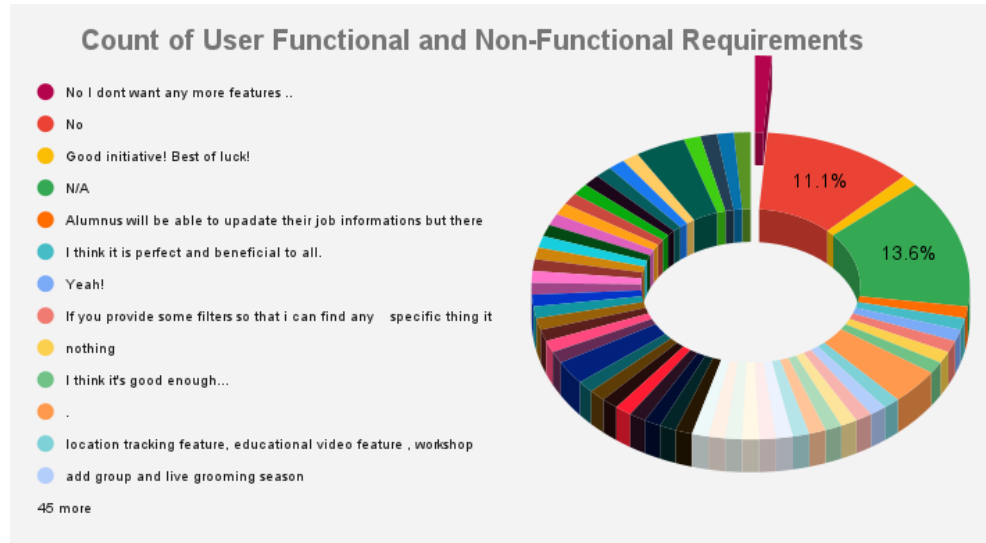


Figure 3.3.1: Users Functional and Non-Functional Requirements

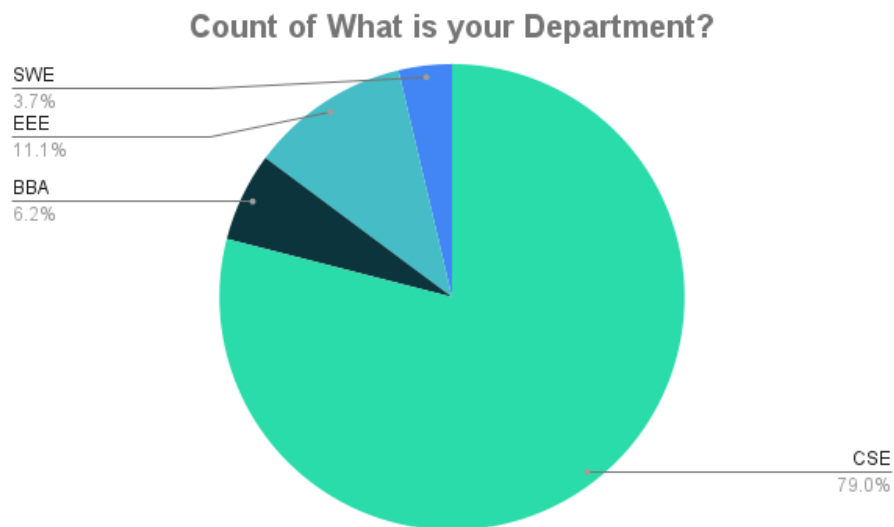


Figure 3.3.2: Number of Department Pie chart

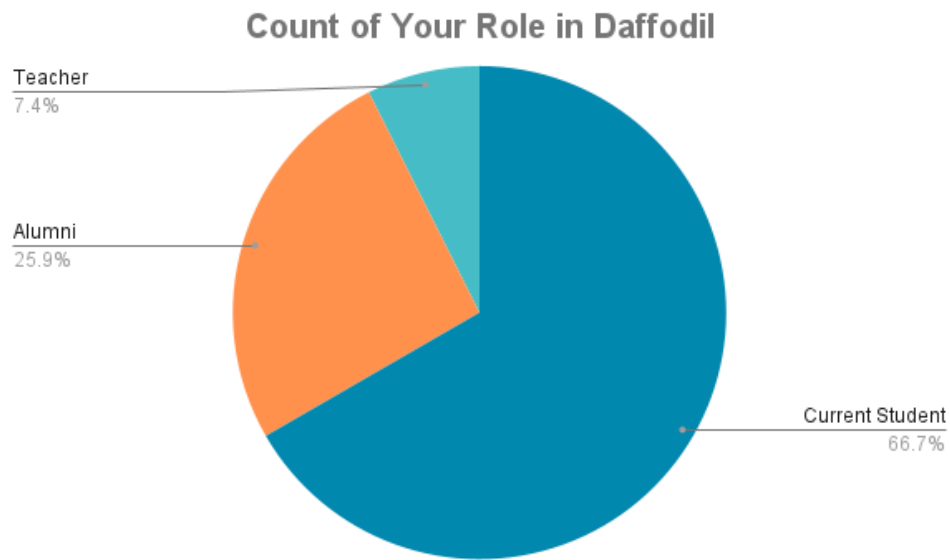


Figure 3.3.3: Percentage of users Pie chart

User Feature Requirements

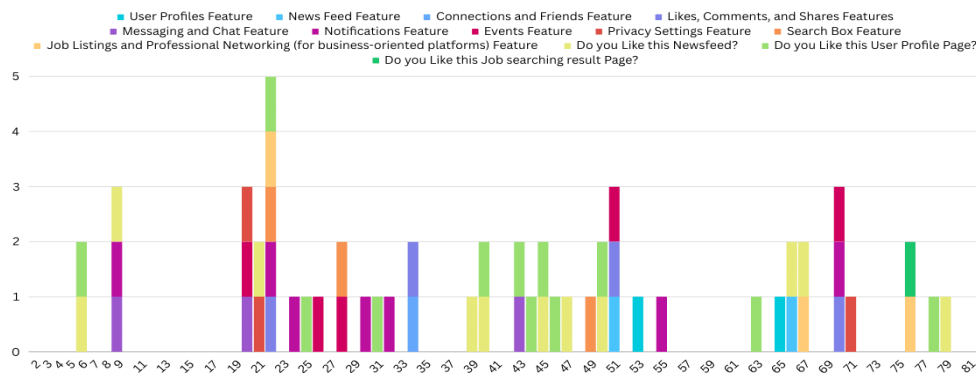


Figure 3.3.4: User Requirements

3.4 Project Management and Financial Analysis

Project Management:

- **Project Objectives:**

- A. To develop a social media-based educational platform to share knowledge and opportunities among the DIU community.
- B. To give a comprehensive and nice solution for technical, educational, job placement, gathering programming knowledge, and others related to study.
- C. To provide a smooth and user-friendly platform for present students, Teachers, and Alumni of Daffodil International University for educational purposes.

- **Project Timeline:**

- A. **Phase 1:** Project Planning and Research (1 week)
- B. **Phase 2:** Design and Prototyping (3 weeks)
- C. **Phase 3:** Front-End Development (5 weeks)
- D. **Phase 4:** Back-End Development (9 weeks)
- E. **Phase 5:** Testing (2 weeks)
- F. **Phase 6:** Deployment (1 weeks)
- G. **Phase 7:** Post-Launch and Marketing (Continuous)

- **Resource Planning:**

- A. **Equipment and Tools:**

- Development and Testing Servers
- High-performance Computers for Development Team Design Software (e.g., Adobe Creative Suite, Visual Studio Code)
- Collaboration Tools (e.g., Slack, Trello, or project management software)
- Version Control System (e.g., Git, GitHub)
- Testing Tools (e.g., Selenium for automated testing)

B. Software and Technologies:

- Front-End Technologies (e.g., HTML, CSS, Tailwind CSS, JavaScript, React)
- Back-End Technologies (e.g., Node.js, Express.js)
- Database Management System (e.g., MongoDB)
- Server Hosting (e.g., AWS, or Google Cloud)
- Payment Gateway Integration (e.g., Bkash, Nagad, DBBL)
- Security Software and SSL Certificates

C. Data and Content:

- User Data: Provided by user through user databases/APIs
- Post Images and Data: Posted by users through the platform with user interaction
- User Documentation: Prepared by the technical writing team

D. Training and Skill Development:

- Ensure that the development team has the necessary training and skills in social media-based educational platform development, security, and database management.
- Provide additional training on specific technologies and tools as needed.

- **Communication Plan**

A. Stakeholder Meetings:

Purpose: Update stakeholders on project requirements gathering progress and gathering feedback.

Participants: Team members, and stakeholders.

Frequency: Bi-weekly or as specified in the project plan.

B. Change Control Meetings:

Purpose: Discuss and approve any changes to the project scope or requirements.

Participants: Supervisor and team members.

Frequency: As needed when change requests arise.

Risk Management:

SWOT analysis involves assessing the Strengths, Weaknesses, Opportunities, and Threats of a project. Here's a SWOT analysis for the e-commerce platform for agricultural products:

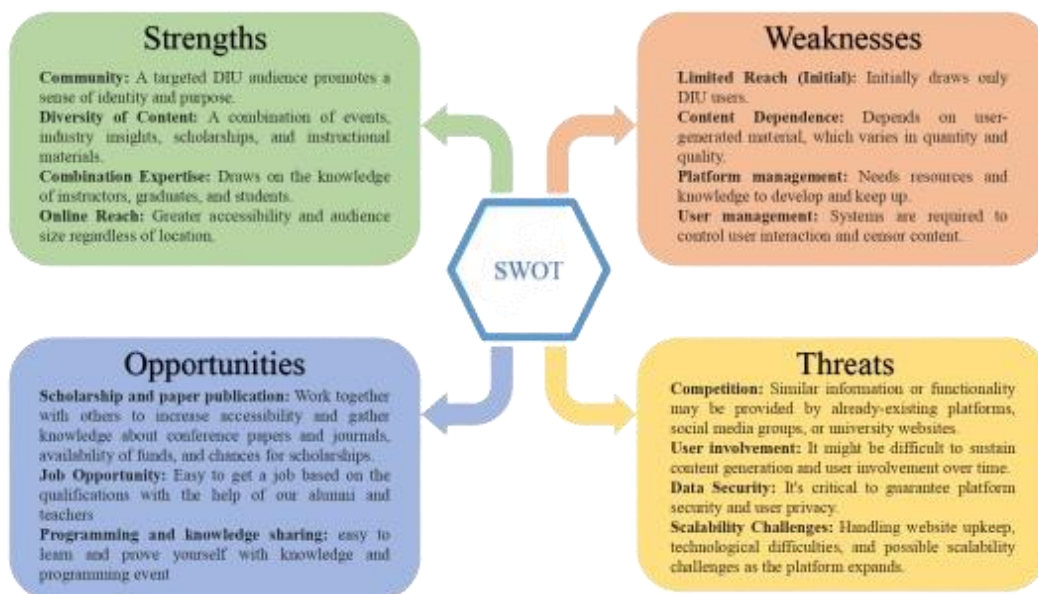


Figure 3.4.1: SWOT Analysis

Financial Analysis:

Table 3.1 Estimated Cost for Web Development Project

SN	Components	Estimated Cost (BDT)
01	Front-end Development	1,50000 BDT
02	Back-end Development	2,00000 BDT
03	Software Testing	50,000 BDT
04	Domain and Hosting	1,10000 BDT
05	Purchase Stock Content	1000 BDT

06	Visiting Stakeholders	500 BDT
07	Doing Online Courses or Training to learn new technology	3000 BDT
08	Documentation and Report Writing	500 BDT
09	Miscellaneous	5000 BDT
10	Digital Marketing	30,000 BDT
11	Contingency (10% of total)	55,000 BDT
Total Estimated Cost		605,000 BDT

3.5 Summary

Using the MERN stack with an emphasis on security and user experience, the "TIE-UP DIU" project created a social media-based learning platform for Daffodil International University.

Comprehensive functional and non-functional needs, such as those related to user authentication, networking, information sharing, disseminating research, organizing events, and career prospects, are outlined in the Software Requirement Specification. System and use case diagrams are used to illustrate the suggested technique, which emphasizes a methodical approach. A user-centric design is ensured via user input gathered using Google Forms. This input covers a range of topics, including functional needs, departmental distribution, login UI preferences, role distribution, and user features. The overall goal of "TIE-UP DIU" is to offer a safe and vibrant virtual environment that is customized to meet the various demands of Daffodil International University's academic community.

CHAPTER 4

IMPLEMENTATION

4.1 Overview

One of the most important stages of software development is implementation. Here, "There are two components to the TIE-UP DIU project: a front end and a back end. Initially, the front end concentrates on user interface design, utilizing daisy UI to encourage greater user involvement and draw in people. Functional tasks like theme customization and click events are performed with vanilla JavaScript. The back-end portion, on the other hand, uses MERN stack technology to achieve flawless connectivity and performance.

4.2 Prototype Design

This project has a prototype with many designs for various pages. The page designs are labeled with various figures below –

Sign-in and Registration Page

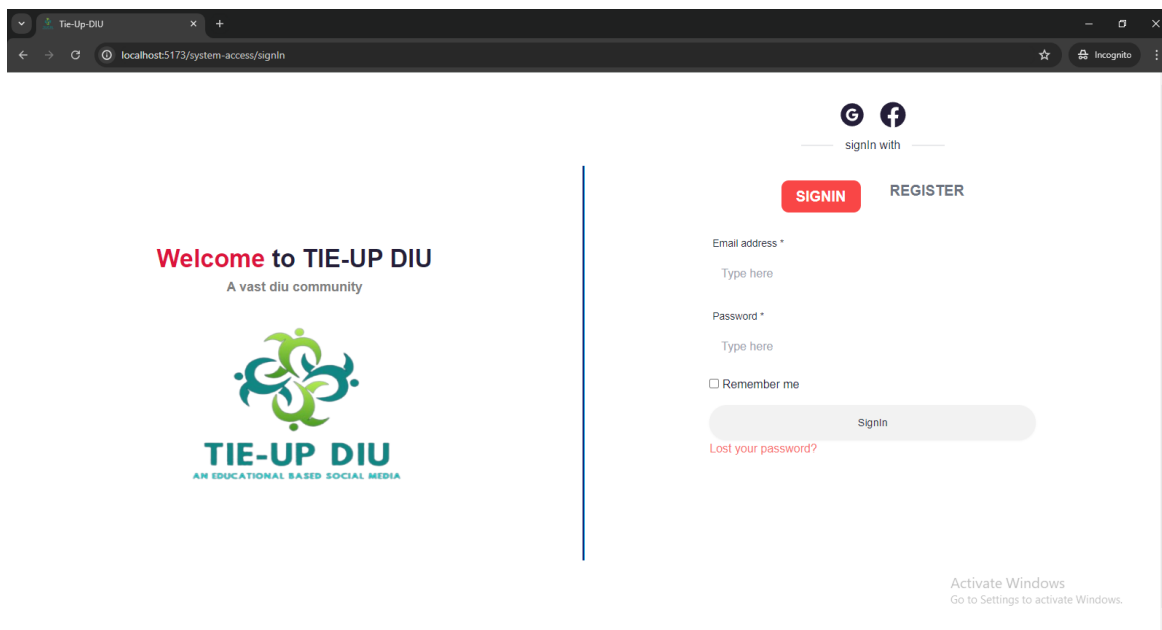


Figure 4.2.1: Sign-in and Registration Page

Social Media Page

On this page, people can only share their posts with images and can share knowledge, whereas other users can see the post.

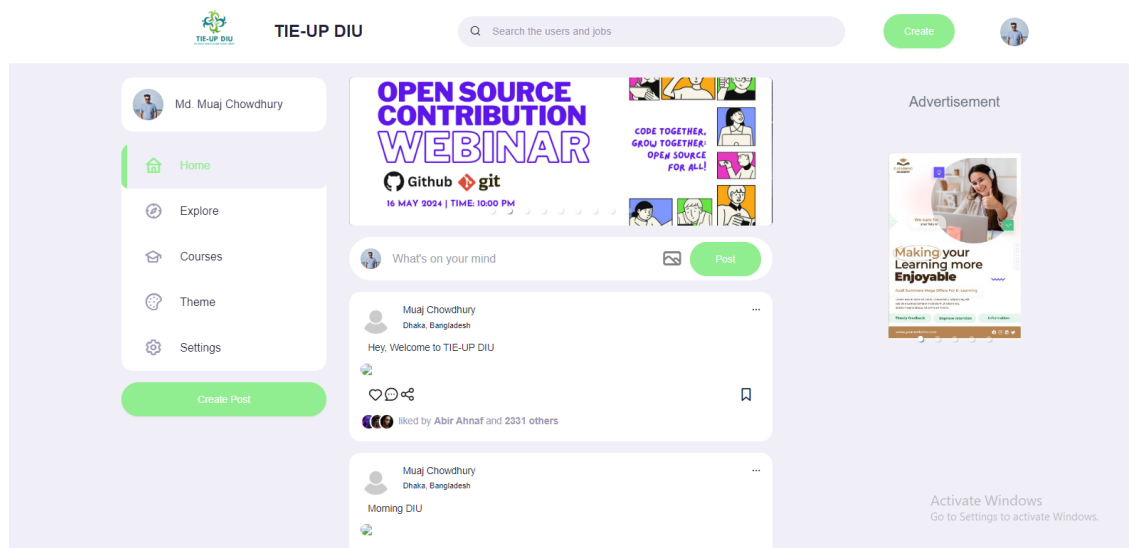


Figure 4.2.2: Social-Media Posting page

Courses Home Page

Here users can find their courses which have already been created by DIU clubs.

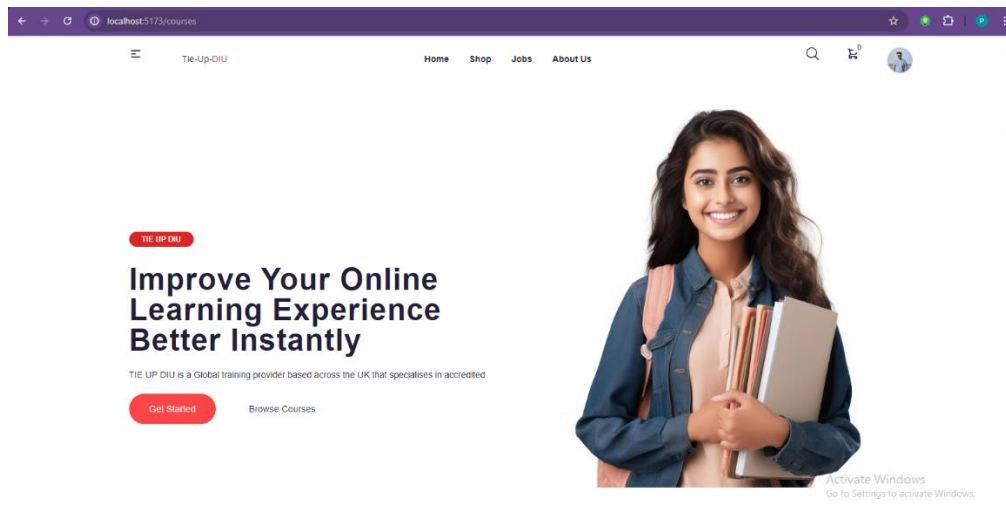


Figure 4.2.3: Courses Home Page

Popular Courses of Different Clubs

Users can buy, and see course details from this section.

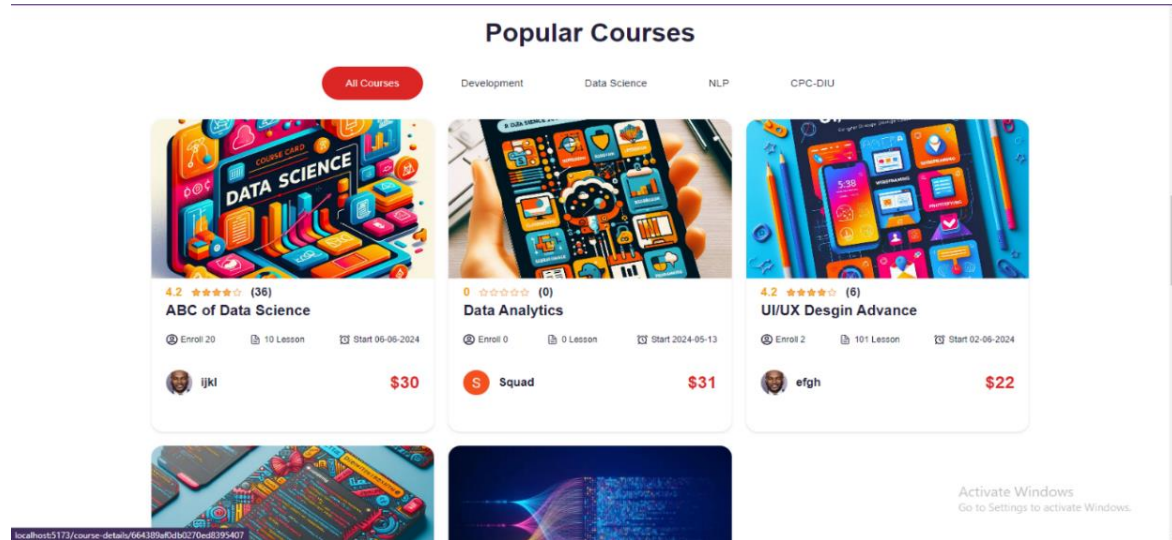


Figure 4.2.4 Popular Courses

Course Details

Users can see the course details in this section and also can add to their cart and make payments.

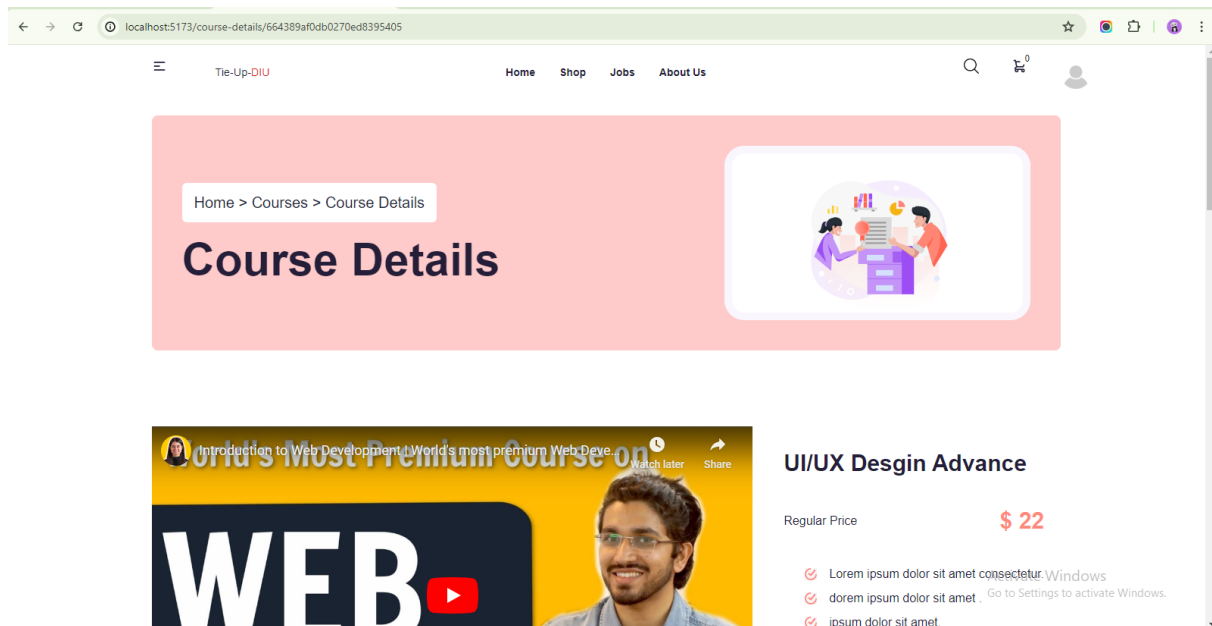


Figure: 4.2.5: Course Details Page

Job Search

Users can search for their dream jobs in this section. They can also search by categories like part-time, full-time, or hybrid jobs and remote jobs.

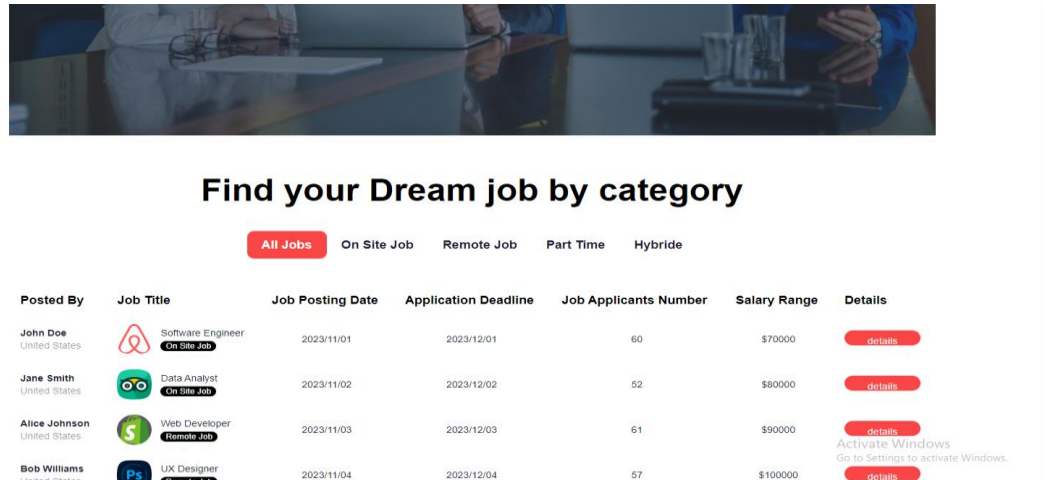


Figure 4.2.6: Job Search Page

About us Page

It shows the motivations, objectives, and scopes of this project to the user.

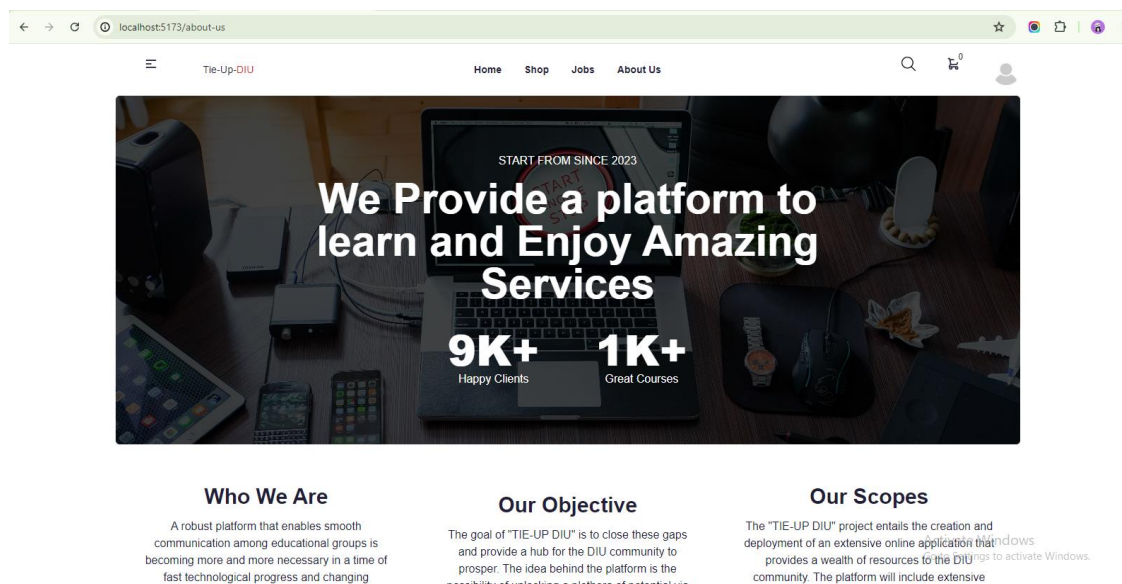


Figure 4.7: About Us Page

User Profile

Here user can see the created profile and can upload their profile photo.

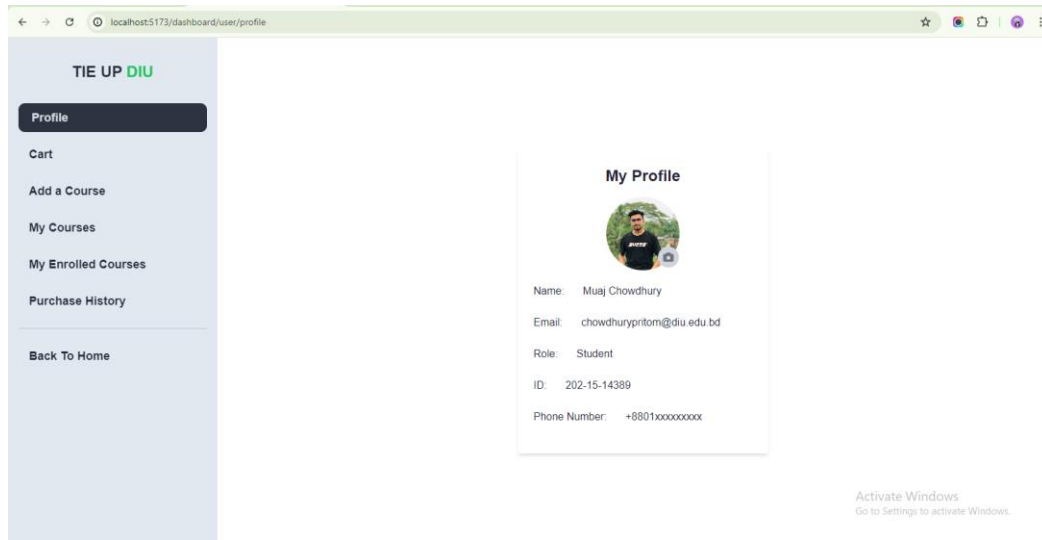


Figure 4.2.8: User Profile Page

Admin Dashboard

Here Admin can see a graph of no. of users beside a pie chart of orders and the number of sold courses.

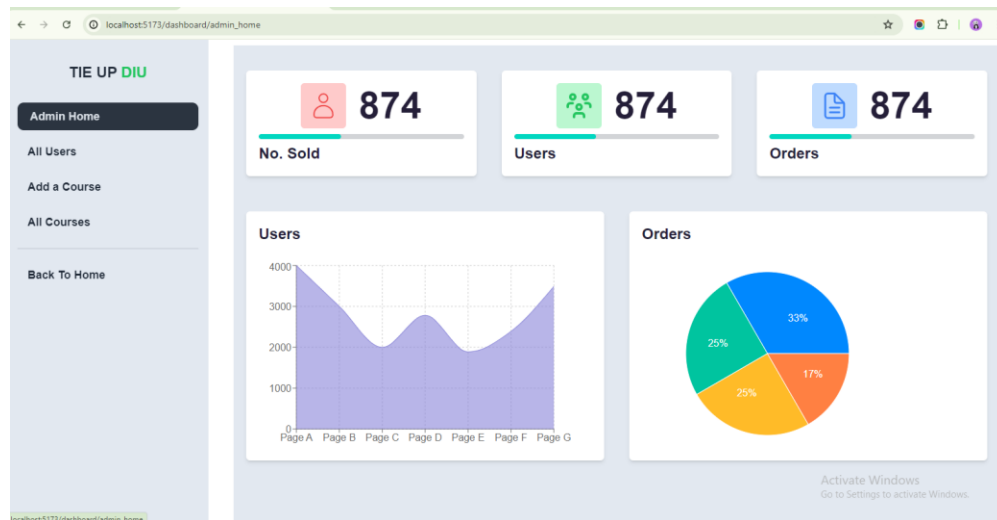


Figure 4.2.9 Admin Dashboard

Add a Course Page

In this section, user can add their course which will show in the courses section

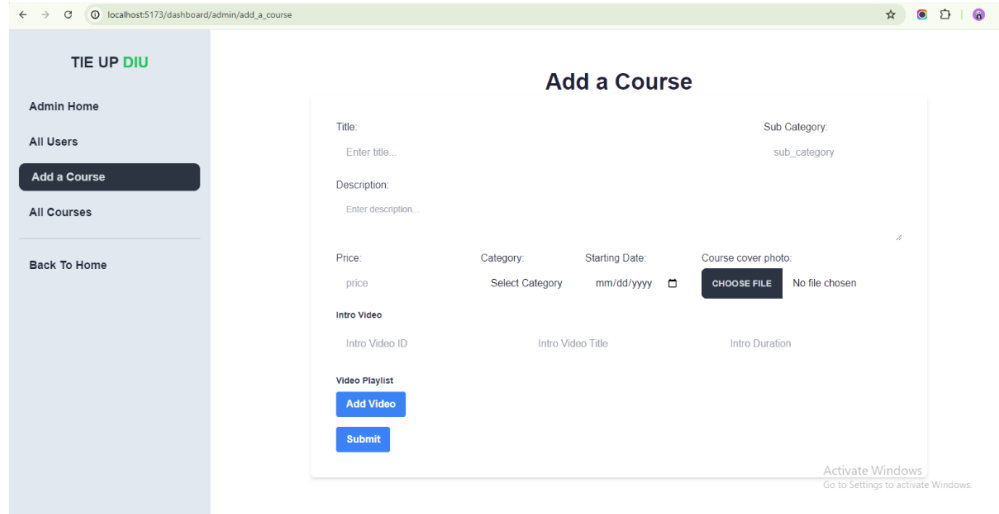


Figure 4.2.10: Add Course section

Payment Gateway

There is an option created for course payment, it will only work when merchant account and SSL Commerz account are created.

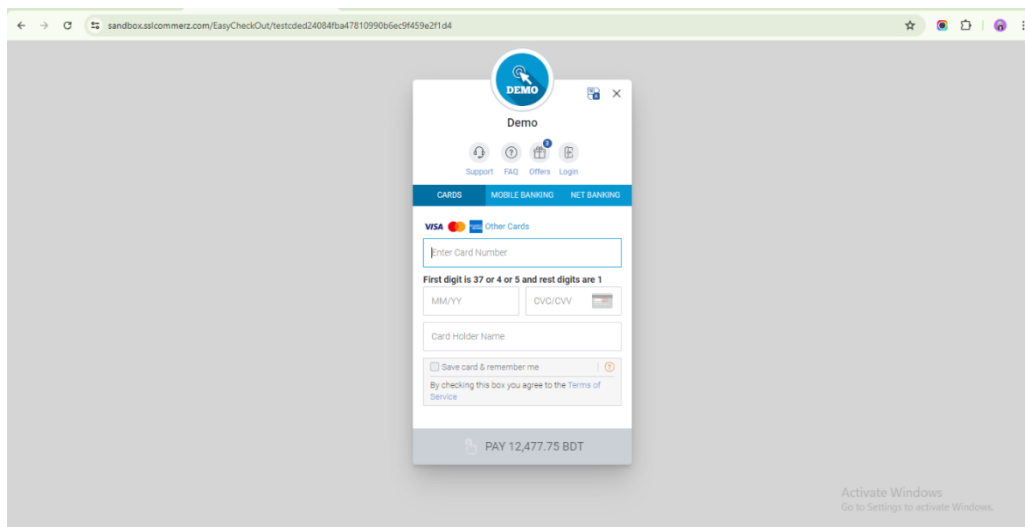


Figure 4.2.11: Payment Gateway

4.3 System Testing

System testing is done on the entire system within the framework of functional requirement specifications, system requirement specifications, or both. System testing examines the system's behavior and design as well as the customer's expectations. Its goals are to find any weaknesses in the system's integrated components and ensure that the system meets all criteria and performs as end users anticipate. There is a system test required for this project. There have been four key tests completed based on this project. They are

- Unit Testing
- Performance Testing
- Load Testing
- Security Testing

Manual testing is used here for both security and unit testing. Unit testing, which was carried out throughout the development stage, verifies every feature of the product. To verify an email address, a verification link is sent to the user's email address using the Google authentication email, which is checked for security. In addition, load and performance testing has been conducted using the JMeter program. When it comes to software testing, performance testing is one kind that is used to evaluate an application's or software product's scalability, speed, stability, and dependability. where the number of users that can access the API simultaneously is also indicated. One kind of software testing called load testing looks at how a system or software product performs when it is subjected to a high amount of stress. It denotes the number of users who can reach this type of website, where "TIE-UP DIU" yields positive results, particularly when signing up, shopping, jobs, and logging in.

4.4 Summary

The front-end and back-end of the TIE-UP DIU project are separate entities. Vanilla JavaScript is used for functionality while daisy UI is used for user interaction in the front-end's user interface design. The MERN stack is utilized by the back end to provide smooth performance and connection. Sign-in/registration, social network posting, courses home, popular courses, course details, job search, about us, user profile, admin dashboard, create a course, and payment gateway are just a few of the page designs that are included in the prototype. Functional and system requirements are tested as well as unit, performance, load, and security tests in system testing. While JMeter is used for load and performance testing, manual testing is utilized for unit and security testing to make sure the system satisfies user expectations and manages stress well.

CHAPTER 5

RESULT AND ANALYSIS

5.1 Overview

The good outcome of each application determines its success. A good working phase is necessary for a successful outcome. The performance of this web application is good under moderate traffic situations. With up to 400 concurrent users, this web-based project maintains an average response time of 170 ms. Beyond this point, the reaction grows linearly. It has good latency and load times for up to 400 users at once. The number of concurrent users led to a proportionate rise in CPU and memory use. However, up to 500 people use the applications, In addition, every feature and functionality produces excellent outcomes. In addition, users are receiving emails verifying their email addresses. It performs well, which is encouraging for the project.

5.2 Simulation Result

"TIE-UP DIU" aims to bridge these gaps and serve as a center for the DIU community's growth. The concept of the platform is in the potential that may be unlocked via interactions between instructors, past students, and present students. fostering close relationships between current students, teachers, and alumni at DIU. creating a platform for the exchange of knowledge, research concepts, and scholarly ideas. Creating channels for graduates of IT companies or seasoned chemists to obtain industry-level coaching and training.

Tools and Technologies:

Front End Technologies

- HTML
- CSS
- Tailwind CSS
- Daisy UI Template
- React
- Java Script

Back End Technologies

- Node JS
- Express JS
- MongoDB
- Firebase

Tools

- JMeter
- Dev tools
- Web Browser
- Visual Studio Code (IDE)

Environment setup and project sequence:

This project simulates a few different sequences. Initially Use the Visual Studio coding IDE to create the project's environment. Since it's an online application, both front-end and back-end components are needed. The front-end portion of the process then begins with configuring the Tailwind CSS libraries and React packages. Subsequently, Node.js is used in the back end to provide a run-time environment for executing various packages such as Express, React, and other nodes. After that, MongoDB is developed to store user data in a database. Lastly, for security reasons, employs Firebase authentication, a Google product.

Project sequence:

Figure 5.2.1 shows the main file of the front end which is named main.jsx. In this file, it connects the root folder and injects it into the index.html file. It also helps to render the JSX. On the other hand, Figure 5.2.2 shows This is the configuration of Tailwind CSS which is a framework of CSS. Tailwind CSS gives predefined classes which helps to make an easy and fancy UI. Both images show the main files of the project structure, from them, one is used for making connections and giving structure to this project, and the other is used for styling the project.

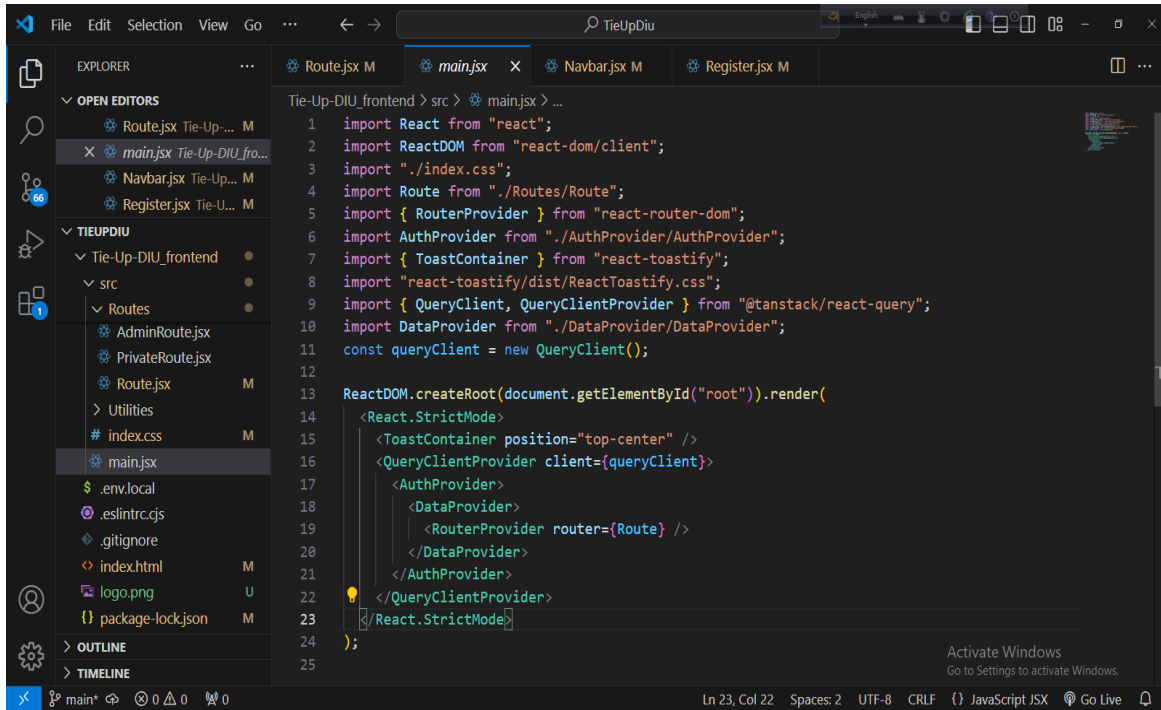


Figure 5.2.1 front-end connection

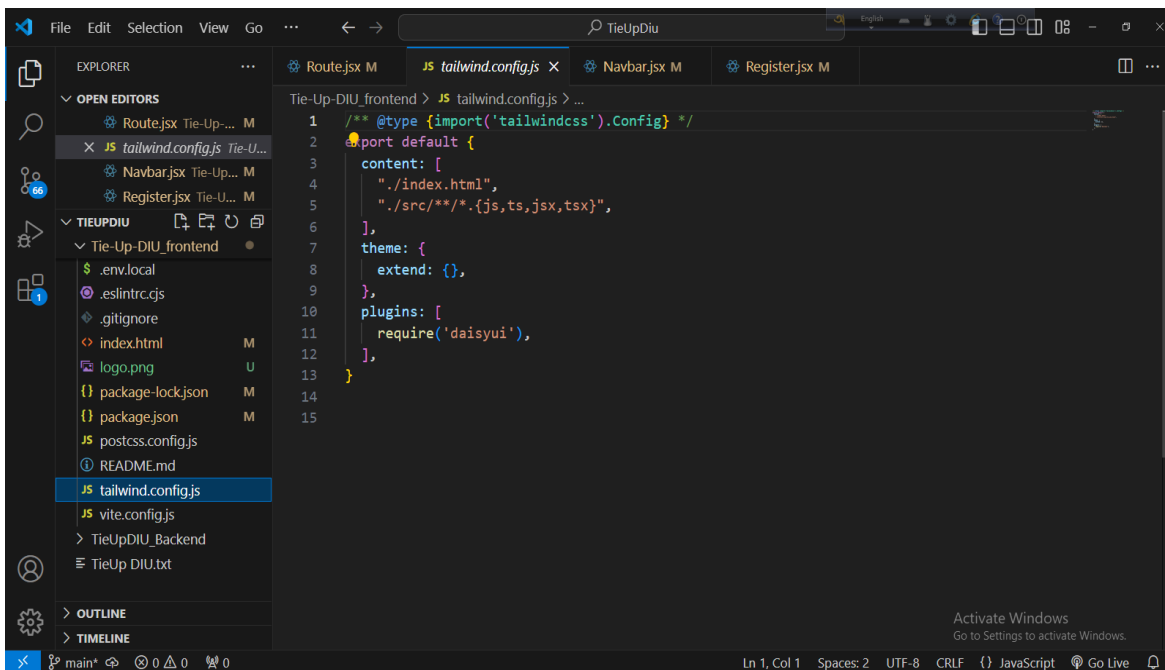


Figure 5.2.2: Tailwind CSS configure

This the packages and modules which is downloaded from Node modules so that they can create a run time environment and run the packages inside the environment.

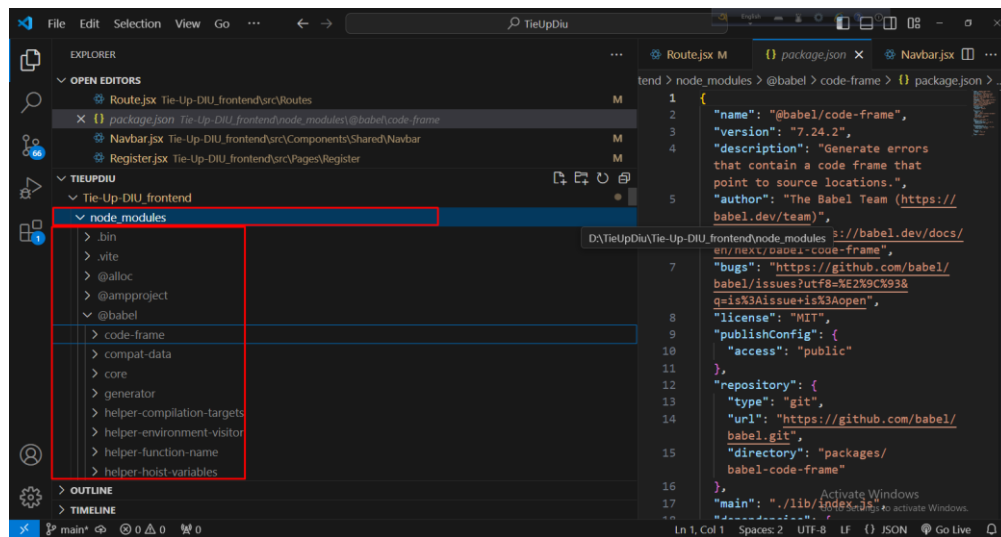


Figure 5.2.3: Importing Node Modules

This is the backend code, where all the backend technologies (Express, Cors, Multer, path, SSL Certificates, and MongoDB) are imported first. Here, ExpressJS is a simple and adaptable Node.js routing framework. Cors communicates from one resource domain to another and is used for data transactions between the front and back ends. File uploads are done using Multer. The payment gateway is SSL Commerz. In conclusion, user data is stored using MongoDB. This file, index.js, is the main one for the back end.

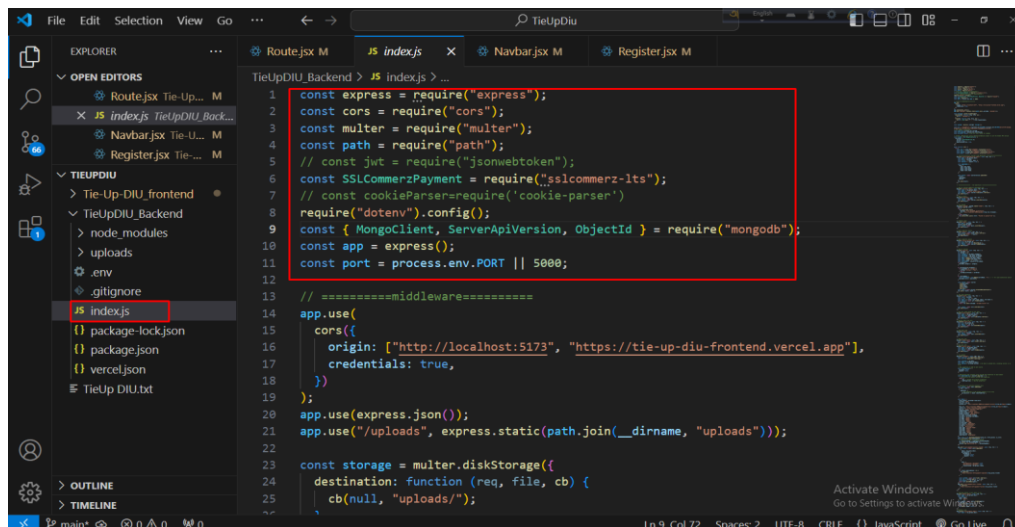


Figure 5.2.4: Back End Setup

5.3 Performance Analysis

After Performing several tests it shows reliable results. This indicates this project is quite good enough for use but needs a fine-tuning and updating process with the help of user feedback. Here are some results for Performance testing and load Testing.

Performance Testing

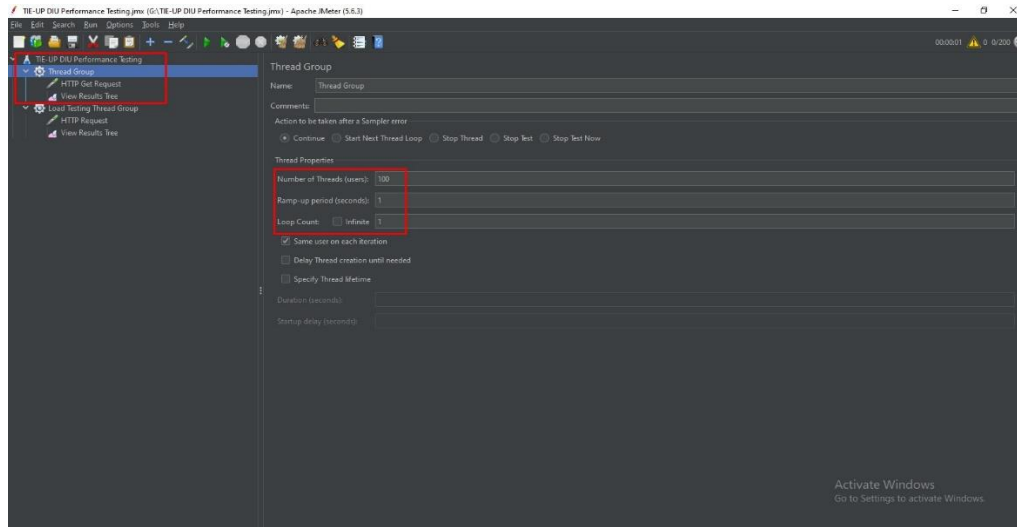


Figure 5.3.1: Set up for Performance Test in JMeter

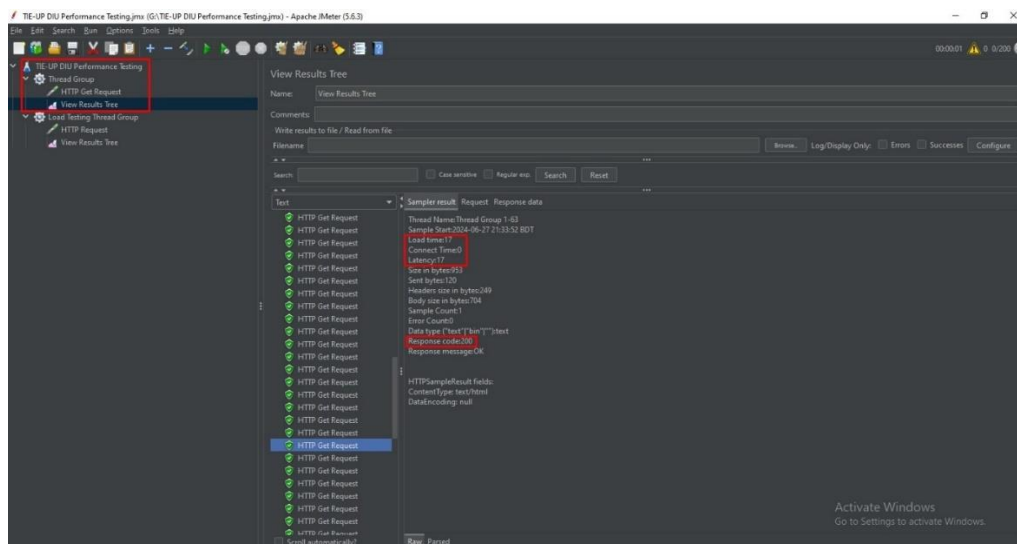
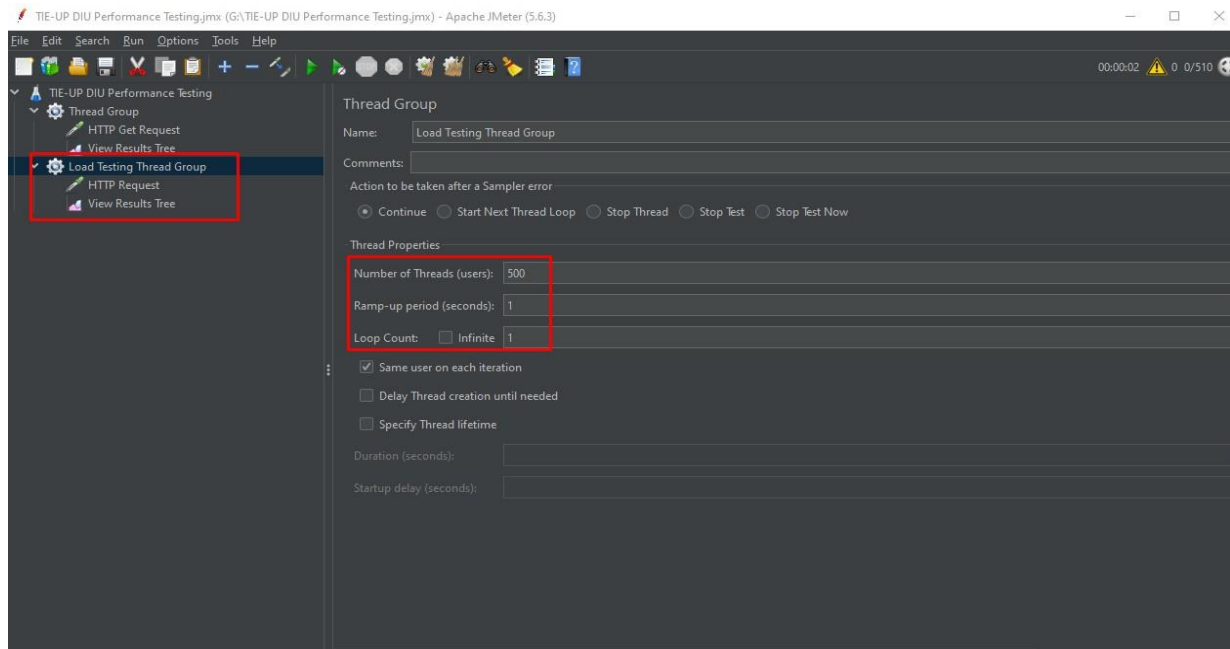
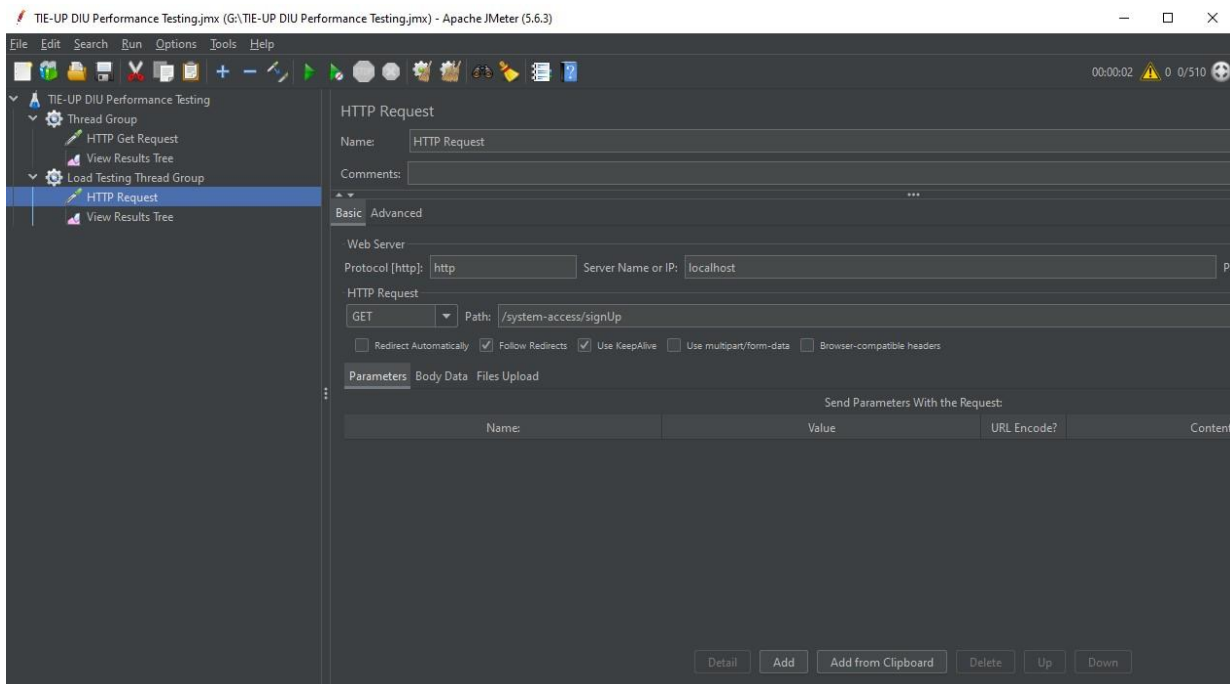


Figure 5.3.2: Performance Testing Result

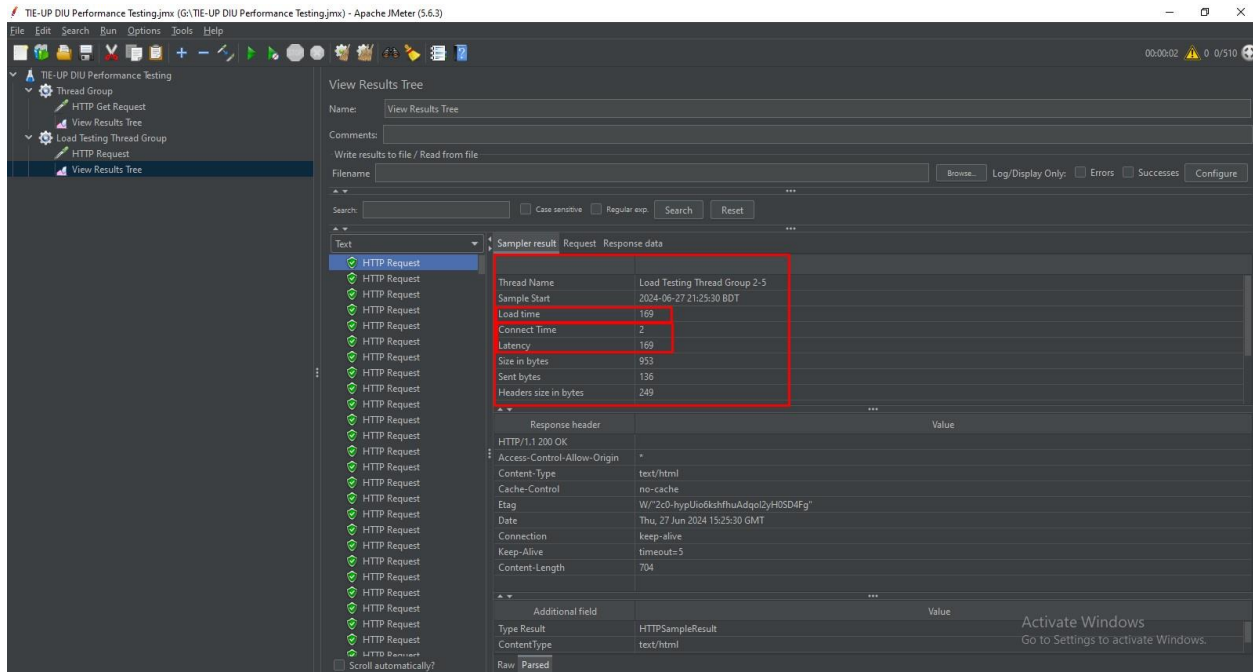
Load Testing



5.3.3: Load Testing Setup



5.3.4: Load Testing HTTP Path Setup



5.3.5: Load Testing Result

In the above image, we can see the performance of “TIE-UP DIU”. When 100 users hit the API of courses and jobs per sec, this project shows very good performance on it. Where we can see the Load Time and Latency both are 17 which is very good and also the status code is 200 which indicates all the processes are running properly. On the other side load testing determines how many users can hit in sign-in and registration page and measures the load of the web application. This project can handle a Maximum of 500 users at a time after that it shows some error or take time to log in.

5.4 Summary

The online application functions effectively with moderate traffic, managing up to 400 concurrent users with an average response time of 170 ms. Performance falls linearly beyond this limit, handling up to 500 users with increasing CPU and memory use. Users quickly get email verifications. Through information sharing and industry-level training, "TIE-UP DIU" seeks to improve community contact among DIU students, faculty, and alumni. On the front end, the project employs HTML, CSS, Tailwind CSS, Daisy UI, React, and JavaScript; on the back end, it uses Node.js, Express.js, MongoDB, and Firebase. The development process is aided by resources such as web browsers, JMeter, Dev tools, and Visual Studio Code (IDE). Configuring Tailwind CSS and React, utilizing Node.js and Express.js for the backend, MongoDB for data storage, and

Firebase for authentication are all part of the project setup. Up to 500 people may be handled with confidence according to performance analysis results; nonetheless, it is advised to fine-tune depending on user comments.

CHAPTER 6

IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY

6.1 Impact on Life

The "TIE-UP DIU" initiative will improve users' lives in several ways, including:

- **Improved Learning and Knowledge Sharing:** Students, alumni, and instructors may readily exchange academic ideas, research concepts, and expertise thanks to a platform created especially for the DIU community. This promotes a culture of lifelong learning and intellectual development.
- **Better Career Opportunities:** Users will be able to network with professionals in the sector, get mentoring, and learn about business intelligence thanks to the platform's networking capabilities. Both current students and graduates may benefit from improved employment opportunities and professional progress as a result.
- **Access to Specialized Training:** "TIE-UP DIU" will provide pre-industry and industry-level training sessions that can provide users with the abilities and information they need to succeed in their particular industries.
- **Research and Publication Opportunities:** The platform will promote academic cooperation and enhance knowledge by offering channels for collaborative research initiatives as well as opportunities to publish research articles in journals.
- **Assistance for International Grants:** By providing a friendly atmosphere for students looking for financial aid to study abroad, the platform hopes to expand access to higher education worldwide.

6.2 Impact on Society and Environment

The "TIE-UP DIU" project can have several broader impacts on society and the environment:

Impact on Society

- **Education and Skill Development:** "TIE-UP DIU" will enhance society's general

educational progress by offering a forum for knowledge exchange, instruction, and mentorship. More educated and competent graduates and students can contribute more productively to a variety of areas, spurring economic development and innovation.

- **Enhanced Research and Innovation:** Collaborative research initiatives and publication opportunities can result in important breakthroughs across a range of disciplines. This might improve DIU's standing and add to the corpus of knowledge worldwide, which could result in improvements in technology, health, and other important spheres of society.
- **Networking and Community Building:** By encouraging a sense of support and belonging among DIU members, the platform will assist in strengthening the community among them. This may result in a society that is more cohesive and cooperative, where people are more eager to share resources and support one another's success.
- **Career and Economic Impact:** The platform may assist people in obtaining better employment and advancing in their professions by enhancing career possibilities and offering training at the industry level. This can improve people's and their families' financial security and income levels, which benefits society's economy as a whole.

Impact on the Environment

- **Less demand for Physical Resources:** Because "TIE-UP DIU" is an online platform, it can lessen the demand for paper and other physical resources for sharing and communication. By doing this, the environmental impact of conventional teaching and communication techniques can be reduced.
- **Minimized Travel and Carbon Footprint:** The platform can lessen the need for travel by enabling virtual gatherings, meetings, and collaborations. A reduced carbon footprint may result from fewer people having to travel for meetings, conferences, or training sessions.
- **Encouraging Sustainable Practices:** The platform may also be used to encourage environmental sustainability education and awareness. The DIU community may assist in creating and putting into practice more sustainable methods in their industries and communities by exchanging information, doing research, and holding conversations.

6.3 Ethical Aspects

Overview

The "TIE-UP DIU" project involves several ethical aspects that need careful consideration to ensure that it serves its intended purpose without causing harm or raising concerns. Here are some

key ethical aspects to consider:

Privacy and Data Security

Safeguarding the personal information of users (students, alumni, and educators) is paramount. The platform implements strong security measures to protect user data from unauthorized access, breaches, and misuse. Users will be fully informed about what data is being collected, how it will be used, and who will have access to it. Obtaining explicit consent from users before collecting and processing their data is essential.

Inclusivity and Accessibility

The platform is designed to be accessible to all members of the DIU community, including those with disabilities. Ensuring that the platform complies with accessibility standards is crucial. The platform promotes an inclusive environment that respects and values diversity. Efforts are made to ensure that all voices are heard and represented, regardless of background, gender, or other characteristics.

Ethical Use of Content

It is crucial to give credit where credit is due and to protect intellectual property rights. It is important to teach users to respect other people's copyrights and to distribute material responsibly. It is important to take precautions against the dissemination of false information and guarantee that the material posted on the platform is trustworthy and correct.

Academic Integrity

Academic integrity must be upheld by promoting original work and correctly crediting sources. It is important to provide users with guidance on ethical collaboration for research and academic initiatives, with an emphasis on transparency and equity in authorship and contributions.

Community Standards and Behavior

Maintaining a polite and encouraging community may be facilitated by creating a clear code of conduct that specifies appropriate conduct and interactions on the platform. To safeguard users and promote a healthy atmosphere, moderating tools and reporting systems must be implemented to handle unwanted behavior, harassment, and bullying.

Conclusion

To serve the DIU community and maintain the highest ethical standards, "TIE-UP DIU" may provide a reliable, courteous, and productive platform.

6.4 Sustainability

Overview

The "TIE-UP DIU" sustainability strategy describes tactics to guarantee the platform's long-term sustainability and beneficial effects on the DIU community. To sustain and expand the platform, this strategy takes into account operational, financial, environmental, and social sustainability.

Financial Sustainability

- **Finance and Sources of Income**
 - **First money:** Obtain first money from industrial partners, educational foundations, and university grants.
 - **Membership Fees:** Establish a tiered membership structure wherein basic access is free and premium services are chargeable.
 - **Sponsorships and Advertising:** Collaborate with pertinent companies and groups to produce income through sponsorships and advertising that is specifically targeted.
 - **Grants and Donations:** Establish a contribution mechanism for supporters and alumni to help the platform flourish, and apply for grants for education and technology.

Cost Management

Use open-source software and cloud-based services, as well as other cost-effective platform development and maintenance strategies. Create a thorough financial plan and budget, and check it frequently to make sure it's still in line with your needs.

Environmental Sustainability

"TIE-UP DIU" is a digital platform that reduces paper waste by minimizing the demand for physical materials. The technology lessens the need for travel by facilitating virtual cooperation and events, which helps to save carbon emissions.

Social Sustainability

- **Involvement of the Community**

Get user feedback regularly to make sure the platform is meeting the changing demands of the DIU community and to make improvements. ensures that everyone feels appreciated and welcomed by fostering a varied and inclusive atmosphere.

- **Effect on Education**

Give users continual training and development opportunities so they may keep up to date on the latest technology and trends in the field. Encourage deep ties and cooperative efforts amongst students, teachers, and alumni to build a solid and encouraging community.

Operational Sustainability

Make ensuring that security updates, new features, and performance enhancements are applied to the platform regularly. Create a scalable platform so that it can accommodate growing user volumes as the community gets bigger.

6.5 Summary

An innovative online platform called "TIE-UP DIU" was created to promote knowledge exchange, skill development, and career growth among the Daffodil International University (DIU) community, which includes instructors, alumni, and current students. The platform significantly improves users' lives by promoting learning, expanding professional prospects, encouraging research and publishing, and building a strong feeling of community. In terms of society, it fosters innovation and research, strengthens bonds within communities, and supports economic stability. Its carbon impact is decreased since it uses less physical resources and travels. In terms of ethics, the project gives top priority to inclusivity and accessibility, privacy and data security, and the ethical use of material, making sure that it upholds user rights and fosters a courteous, encouraging atmosphere. With a thorough sustainability strategy, "TIE-UP DIU" hopes to continue serving the

DIU community for many years to come, offering operational, financial, social, and environmental advantages.

CHAPTER 7

CONCLUSION AND FUTURE WORK

7.1 Conclusions

The TIE-UP DIU project serves as an example of a strong web platform intended to promote knowledge sharing, skill building, and professional advancement among Daffodil International University (DIU) community members, faculty, and alumni. The platform guarantees seamless speed and connection by using cutting-edge front-end technologies like HTML, CSS, Tailwind CSS, Daisy UI, React, and JavaScript, and a back-end powered by Node.js, Express.js, MongoDB, and Firebase. Up to 500 people may be handled by the system without issue, however speed optimization is advised. Thorough testing, encompassing load, security, performance, and unit tests, guarantees that the system satisfies user requirements and efficiently handles stress. The platform's ecological architecture reduces the need for physical resources and travel, and its dedication to diversity, data security, and ethical content usage fosters a positive atmosphere. TIE-UP DIU strengthens DIU's academic and social fabric by promoting career opportunities, research, and community participation. This promotes societal innovation and economic stability.

7.2 Further Suggested Works

Since it is a web service focused on our university, there are plans for its future. To enable people to voice their opinions, for instance, consider enabling them to respond and comment on postings. In addition, the ability to create events and send messages will be added. corporations will be able to register individually if the earning side is taken into account; in such case, corporations will receive a one-year membership by paying a charge at the time of registration. Additionally, there will be an advertisement section where reputable IT colleges in the nation can pay a set cost to publicize their courses for a predetermined amount of time. Our learning environment will get stronger as a result, and these developments will assist our initiative to move closer to its objective. This project requires continuous development and learning because that ensures a lifelong sustainability of a project and help to fulfill the expected objectives.

7.3 Limitations

This project has several restrictions because it is a scheduled project. The large database needs cannot be met by this project. Because it doesn't have a domain name or hosting, it isn't currently

operating on the internet. The inability to comprehend multiple database connectivity hinders the development of social response and connection characteristics. Although it has to be optimized for increased concurrency, the existing design is appropriate for a modest load. To increase speed, future developments will concentrate on caching implementations and database interaction optimization.

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Appendix A

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

Title: A SOCIAL MEDIA-BASED EDUCATION PLATFORM: “TIE-UP DIU”

Student ID: 202-15-14389

CO Description for FYDP

CO	CO Descriptions	PO
Phase -I		
CO1	Integrate recently gained and previously acquired knowledge to identify a web based travel management 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	The project covers Engineering Fundamentals (K3) through process modeling, data design, and front-end development, showcasing strong engineering principles application. The project tackles Specialist Knowledge (K4) by integrating front-end and back-end design, interaction design, and user experience (UX), utilizing HTML, CSS, Tailwind CSS, Java Script, React for the front end, and Node JS frameworks like Express JS for the back end, demonstrating expertise in Social Media-based Education system.	Page no: [10-16], Section: [3.2, 3.3]
				The project applies engineering practice & design (K5) by integrating design requirements like user interface, security, scalability, customization, compatibility, accessibility, and reliability, ensuring a robust and user-centric. The project addresses engineering practice & technology (K6) by employing HTML, CSS, Tailwind CSS, Java Script, React, Node JS, Express js, Mongo DB, and Firebase, emphasizing safe, scalable development with MERN Stack Technology.	Page no: [11-20], Section: [3.3, 3.4]
				The project covers research literature K8 by reviewing analogous platforms, educational platforms, security protocols, and industry	Page no: [5-7],

				trends, enabling informed decision-making for integrating innovative features into this system.	Section: [2.2, 2.3]
2.	EP2: Range of Conflicting Requirements	Yes	CO2, and CO7	The project confronts EP-2 by addressing challenges like integrating diverse features while maintaining user experience, balancing security with functionality, scalability, real-time data synchronization, evolving industry standards, privacy regulations compliance, and implementing effective recommendation systems through careful planning. In this project I face challenges to collect user requirements from Daffodil International University students through Facebook.	Page no: [8-9, 11-16] Section: [2.4, 2.5, 3.3]
3.	EP3: Depth of analysis required	Yes	CO2, and CO6	The project tackles EP-3 by prioritizing solutions like contemporary front-end design for enhanced user experience and selecting Laravel for streamlined back-end development, addressing challenges such as user interaction optimization, platform accessibility, and scalability to provide a superior web-based travel management system.	Page no: [21-27], Section: [4.2, 4.3, 4.4]
4.	EP4: Familiarity of Issues	Yes	CO8	The project fulfills EP-4 by integrating insights from education management into development. This project also faces some common problems like ensuring data security and maintaining performance with a huge number of traffic, it faces challenges in signing in multiple users at a time.	Page no: [8, 32-34], Section: [2.4, 5.3]

5.	EP5: Extends of application codes	Yes	CO5	This project fulfills EP-5 by creating future scopes and opportunities and also have future development scope which push the project to its main goals and objectives	Page no: [42] Section: [7.2]
6.	EP6: Extends of stakeholders involved and conflicting	No	CO8	N/A	N/A
7.	EP7: Interdependence	Yes	CO5	The project meets CEP, EP-7 by addressing several sub-systems that depend on each other such as functional features also the front-end and back-end are connected to each other.	Page no: [10-11, 28-31] Section: [3.2, 5.2]

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	The development of this system leverages a skilled team across domains, meticulous financial resource allocation for infrastructure, marketing, and development, and utilizes tools like JMeter, Visual Studio Code, and various programming languages, frameworks, and databases for effective execution.	Page no: [28-31], Section: [5.2]
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		This project emphasizes social impact and environmental sustainability by enhancing education, research, and innovation through knowledge exchange and collaboration, fostering a more skilled and productive society. It reduces environmental impact by decreasing the need for physical resources and travel, thus lowering the carbon footprint.	Page no: [36-37], Section: [6.1, 6.2]
5.	EA-5: Familiarity	Yes		The Comparative Analysis and The success of "TIE-UP DIU" relies on creating a more inclusive community, enhancing functionality and user experience, and clearly defining project objectives. It promotes dynamic engagement through active support for courses and job placements while prioritizing robust user authentication with Google Authentication.	Page no: [8], Section: [2.4]

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

SN	COs	Attainment	Justification	References
1	CO4	Yes	The project captures CO4 by integrating financial management practices, including budgeting, resource allocation, cost management, and risk mitigation, ensuring efficient fund distribution.	Page no: [17-20], Section: [3.4]
2	CO9	Yes	"TIE-UP DIU" addresses key ethical aspects by ensuring user privacy and data security, promoting inclusivity and accessibility, and	Page no:

			upholding academic integrity and ethical content use. It maintains community standards with a clear code of conduct and moderation tools to foster a respectful and supportive environment.	[37-39], Section: [6.3]
3	CO10	No	N/A	N/A
4	CO12	Yes	The project's implementation phase emphasizes lifelong learning because it needs continuous development and technology is a part of the continuous update, the more learning tools and technologies and more up-to-date, the more development will occur in the project.	Page no: [28-31, 42], Section: [5.2, 7.2]

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