

Kathmandu University
Department of Computer Science and Engineering
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A Project Proposal
on
“StudyHub”

[Code No: COMP 206]

(For partial fulfillment of II/I in Computer Engineering)

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Abstract

This project seeks to provide a comprehensive website for the Department of Computer Engineering, allowing students to easily access a centralized repository of study resources using web-development technologies. The website will offer lecture notes, past exam papers, assignments, and important notices to help students succeed academically and improve their learning outcomes. By unifying these resources, the website addresses the prevalent issue of resource fragmentation, allowing students to find relevant content fast. Key features will include easy navigation, resource classification by course and semester. This project intends to boost academic achievement, promote self-study, and build a collaborative learning environment.

Keywords: *Web-Development, framework, full-stack, centralized resources*

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Acronyms/Abbreviations

The list of all abbreviations used in the documentation is included in this section. See the example below:

HTML	Hypertext Markup Language
CSS	Cascading Style Sheets
MERN	MongoDB, Express, React, Node
JWT	JSON Web Token
JSON	JavaScript Object Notation
macOS	Macintosh Operating System

Chapter 1 Introduction

Accessibility and academic collaboration are the need of the hour in the fast-changing world of educational pedagogies, more so in streams related to computer science and engineering studies. The problem of fragmentation of study resources over various platforms, which very often converts to ineffective access and scattered knowledge is repeatedly experienced by students of Computer Science and Engineering. The following is a project proposal for StudyHub, a dedicated online platform designed to promote easier access for students by centralizing departmental study materials and academic resources within one easy-to-access platform. StudyHub will be designed to ensure it provides a dynamic, safe, and user-friendly platform using a backend framework such as Node.js alongside modern web technologies like HTML, CSS, and JavaScript. StudyHub overcomes the limitations in existing departmental websites that are often non-interactive and have obsolete designs by incorporating resource categories according to course and semester, ease of navigation, and security in communication. Other than making available at easy access some of the important materials like lecture notes, previous test papers, assignments, and announcements regarding the department, it will also provide a collaborative environment for students to interact with each other, request help, and motivate self-learning.

1.1 Background

The development of departmental resource-sharing websites has become increasingly significant in the realm of computer science and engineering education. With the rapid shift toward digital learning environments, academic institutions are now prioritizing platforms that facilitate the consolidation of study materials, important announcements, and interactive communication tools for students. Recent advancements in web development technologies, particularly the use of HTML, CSS, and JavaScript, have enabled the creation of dynamic, user-friendly websites that enhance accessibility and

interactivity. These technologies, alongside modern frameworks such as React and Angular, allow for more sophisticated user experiences, enabling seamless navigation and efficient resource sharing. Additionally, integrating backend solutions like Node.js and cloud storage has streamlined the storage and retrieval of educational materials, thus promoting collaboration among students.

Despite these advancements, many existing departmental websites encounter significant limitations that can hinder their effectiveness. A common issue is the static nature of these platforms, which often lack the interactivity necessary to engage users fully. Outdated interfaces can complicate navigation, making it challenging for students to find relevant materials or connect with peers and faculty. Furthermore, security and privacy concerns pose additional challenges; inadequate protection of user information, such as messages or uploaded documents, can lead to breaches of trust and safety among users. These drawbacks highlight the urgent need for platforms that not only host resources but also prioritize user engagement and security.

The significance of this project is rooted in its potential to address the limitations of existing departmental resource-sharing platforms by implementing modern web technologies that enhance both functionality and user experience. By creating a secure and interactive website designed specifically for study material sharing, this project aims to establish a comprehensive repository that meets the diverse needs of students across various subjects and semesters. Moreover, the project emphasizes the importance of fostering a collaborative academic environment, enabling students to communicate effectively and seek assistance from their peers and seniors. Ultimately, this initiative serves to create a robust educational resource that not only improves academic engagement but also cultivates a supportive community within the department, adapting to the evolving landscape of higher education.

1.2 Objectives

- To establish a dedicated platform that organizes and provides easy access to key departmental information and updates for Computer Science and Engineering students.
- To offer a structured repository of study materials for a range of subjects across all semesters, supporting students' academic needs.
- To facilitate student-to-student guidance by implementing a messaging feature, enabling students to reach out to willing seniors for academic support and mentorship.
- To develop a user-friendly and visually appealing interface that makes navigation and resource access straightforward for students at all levels.

1.3 Motivation and Significance

Navigating academic resources and departmental information can be challenging for students, especially with resources scattered across various platforms. While other departments have established websites to address this issue, our Computer Science and Engineering department lacked a dedicated platform. This led us to create **StudyHub** — a centralized academic resource website tailored for our department.

StudyHub simplifies access to crucial study materials, departmental information, and provides a unique mentorship feature, all in one place. By consolidating resources and facilitating peer support through senior-student messaging, StudyHub enhances students' academic experience. With organized resources, an intuitive design, and mentorship options, it offers students an efficient tool for studying and academic collaboration. StudyHub allows students to find relevant materials quickly, freeing up time to focus on learning and skill development. This user-centric platform supports seamless access to resources while fostering a supportive academic community.

1.4 Expected Outcomes

- Establish a user-friendly platform for efficient academic resource access.
- Foster a supportive community through peer-to-peer mentorship features.
- Provide a dedicated platform for timely department news and notices.

Chapter 2 Related Works/ Existing Works

2.1 Website of Society of Electrical and Electronics Engineers – KU (<https://seee.ku.edu.np/>)

The Society of Electrical and Electronics Engineers (SEEE) at Kathmandu University (KU) supports students in the Department of Electrical and Electronics Engineering through academic and social initiatives. Founded in 2000, SEEE promotes student welfare, organizes academic events, maintains an alumni network, and publishes an annual magazine, Encipher. This website aims to foster a collaborative community for both academic and extracurricular growth.



Figure 1 SEEE Website

2.2 Kathmandu University e-Learning Forum

(<https://elf.ku.edu.np/>)

The Kathmandu University e-Learning Forum (KU-ELF) is a flexible digital space where students and faculty connect for coursework and academic activities. Designed to make learning accessible and interactive, it provides tools for accessing course materials, submitting assignments, joining discussions, and more—all through an easy-to-use online platform. With its range of features, KU-ELF supports both in-class and remote learning, fostering collaboration and making academic management smoother for the KU community. One of KU-ELF's standout features is its extensive collection of past exam papers, making it an invaluable resource for students preparing for exams. The collection allows students to review and practice with real exam questions, helping them understand the format and expectations.

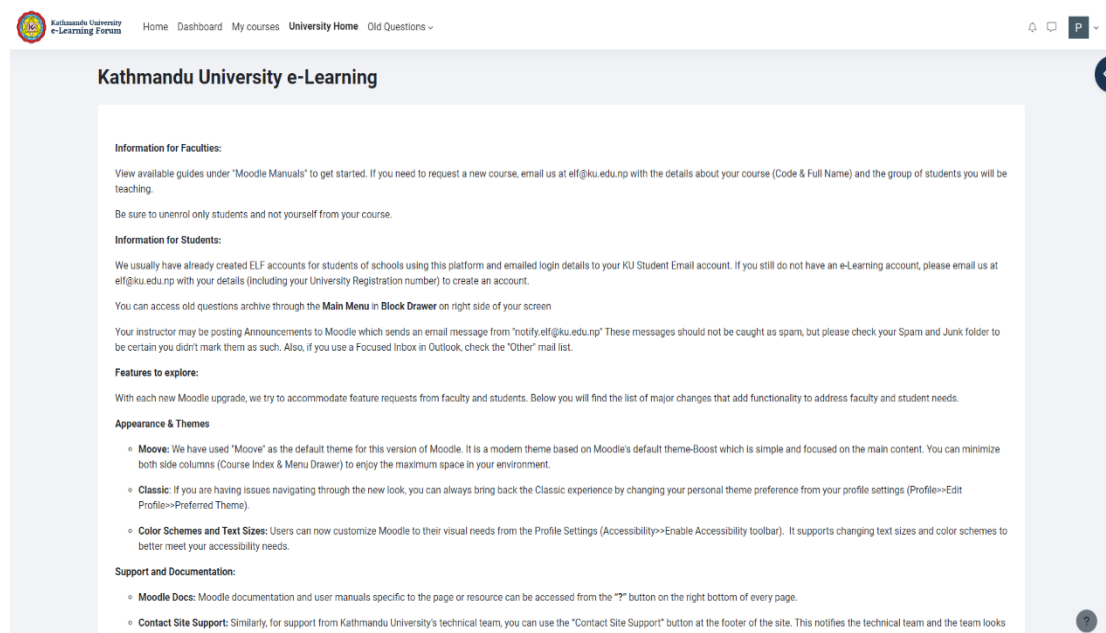


Figure 2 e-Learning Forum

2.3 Website of Kathmandu University Computer Club

(<https://kucc.ku.edu.np/>)

The Kathmandu University Computer Club (KUCC) website provides a hub for information about KUCC's activities, resources, and events. Established in 1997, KUCC focuses on nurturing a tech-savvy community through programs like hackathons, IT Meet, coding competitions, and workshops on trending tech topics. The website highlights these events, showcases achievements, and offers resources for students interested in areas like cybersecurity, AI, and software development. It also hosts *IT Express*, KUCC's magazine, sharing insights into student projects and tech trends.

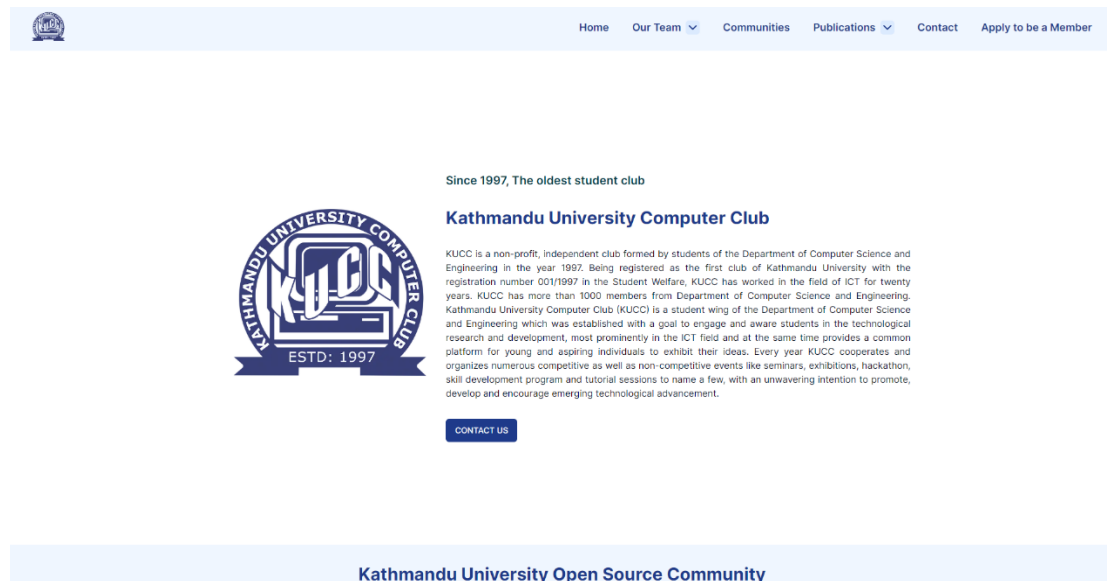


Figure 3 KUCC Website

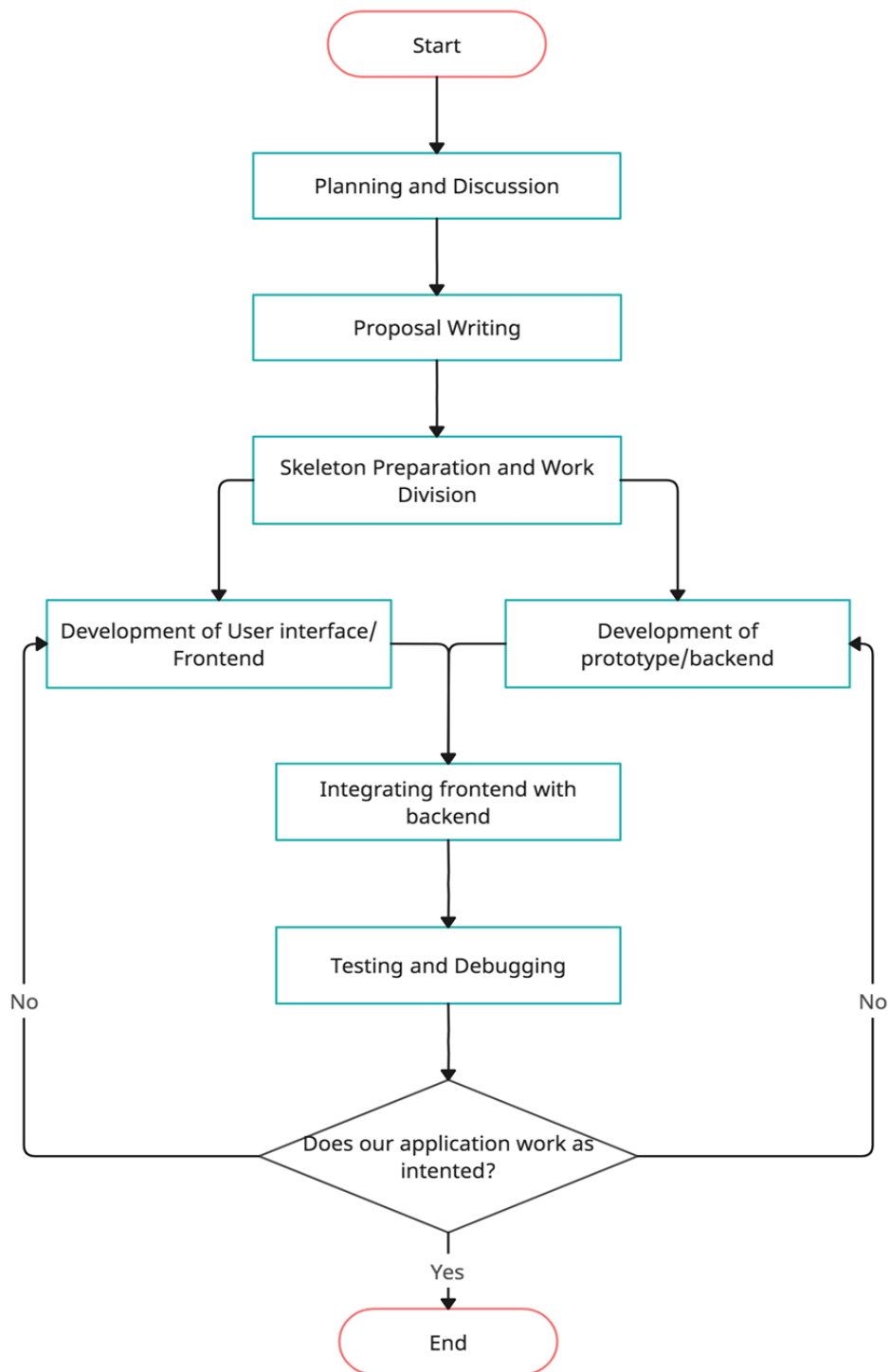
Chapter 3 Procedure and Methods

Our team came together and explored different project ideas, eventually deciding on a study resource website that brings together materials and guidance resources from various sources into one easy-to-access platform. We selected JavaScript as our primary programming language, aiming to strengthen our skills in this technology.

We know that finding reliable study materials can be a daunting task for students, so we started with brainstorming sessions to create a solid foundation for the website. This initial planning phase allowed us to focus on the core strengths of our project, aiming to design a platform that would genuinely help students here at Kathmandu University. After outlining the framework, we will divide the tasks to ensure everyone has an opportunity to contribute fairly. Alongside exploring different frameworks necessary for the project, we began building a prototype and designing the user interface.

As our prototype and user interface evolve, we will continue integrating these components and testing their functionality. Throughout the development phase, we will rigorously document our progress. Once integration is complete, and our application has undergone thorough testing and debugging, we will finalize the documentation and prepare the application for release.

Ultimately, our goal is to create a platform that becomes a trusted resource for students, making studying easier and more accessible to the students of computer engineering at Kathmandu University. We're excited to bring this vision to life and see how it can help fellow students in their academic journeys.



Chapter 4 System Requirement Specifications

4.1 Software Specifications

We will be using a combination of technologies to develop our project, which serves as a platform for news, notices, and academic resources for computer engineering at Kathmandu University.

4.1.1 Front-end Tools:

The front-end will be developed using React.js, complemented by HTML and CSS to create a responsive user interface.

4.1.2 Back-end Tools:

The back-end will utilize Express.js for routing and Node.js to handle server-side JavaScript execution. MongoDB will be used as the database to store and manage content. Additionally, we will implement JWT (JSON Web Token) for secure data transmission between users and the server.

4.2 Hardware Specifications

Any computer capable of running a web browser and a development environment is suitable for our application. The minimum requirements include:

- Processor: Intel i3 (or equivalent)
- RAM: 2GB
- Storage: 12GB with at least 4GB of free space
- Operating System: Windows 10, macOS 10.14, or a recent Linux distribution

Chapter 5 Project Planning and Scheduling

This project aims to develop a website using the JavaScript MERN stack over a **14-week semester**. The development process is divided into four phases:

1. **Initial Phase (2 week):**
 - a. Generate project ideas and prepare the project proposal.
2. **Development Phase (8 weeks):**
 - a. Focus on building the prototype and user interface, integrating various components.
3. **Testing Phase (3 weeks):**
 - a. Conduct rigorous testing, debugging, and adjusting code to ensure functionality and reliability.
4. **Documentation Phase (1 week):**
 - a. Compile and finalize the project report.

The following Gantt Chart represents the timeline allocated for the completion of our project by the end of the semester.

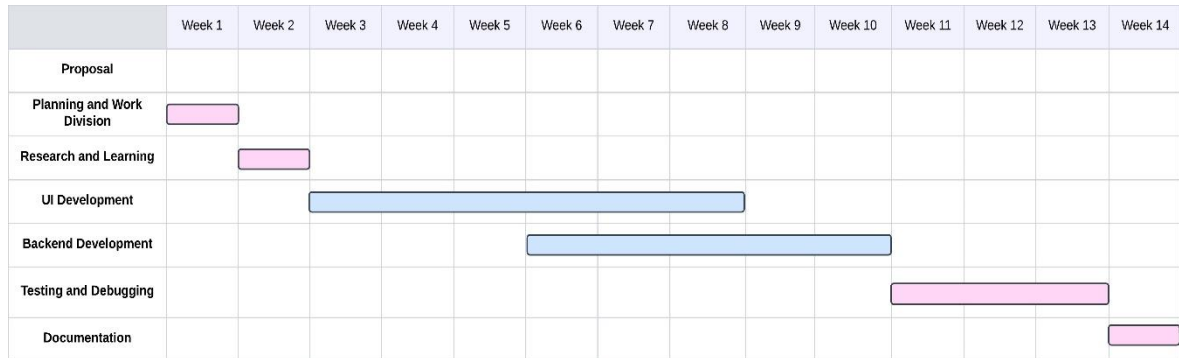


Figure 4 Gantt Chart

5.1 Tasks:

1. Proposal
2. Planning and Work Division
3. Research and Learning
4. UI Development
5. Backend Development
6. Testing and Debugging
7. Documentation

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