IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 5, April 2026
Impact Factor: 8.2

# Design and Implementation of a Smart Web-Based Student Mentoring Portal for Institutional Academic Process Digitalization

**Ms. Juveriya Anis Shaikh and Mr. Om Ravindra Mahind**
Department of Computer Engineering
Rajarambapu Institute of Technology, Rajaramnagar, India

**Abstract:** *Mentoring is a conventional method of transferring knowledge and ideas from a confirmed professional in a society to an inexperienced member in the sector. Education sector has found mentoring as quite effective tool since long back and with the advent of new technologies, comes an idea of online mentoring, which is also referred to as e mentoring. Instead of face-to-face meetings, Online Mentoring System (OMS) uses asynchronous, electronic communications to establish and support the relationship between mentor and the student using virtual mode. E-Mentoring uses computerized medium to transfer knowledge and skills from teacher to student. It basically focuses on student and faculty relationship. Online Mentoring System is a Client Server model, which acts as an Interface between Teacher and Student. OMS strives to reduce the work load of students in entering their details and at the same time enable the Mentors to assess their students more efficiently. EMentoring is fundamentally developed to improve the performance of students by assisting mentors to understand the problems of students more effectively and easily. In order to achieve this, a rating system is also included using which mentors can easily evaluate and sort the performance of the students and concentrate on those who need there guidance. Matching algorithm is used in this system..*

**Keywords:** Student Mentoring, Academic Digitalization, Web-Based System, Three-Tier Architecture, Automated Reporting, Educational Technology

## I. INTRODUCTION

Mentoring is an important academic support system in colleges and universities which supports students with their grades, career growth, and personal problems. Because it's important, many schools still use paper-based methods and manual record-keeping systems to keep records of mentoring activities. These methods stop working and become hard to keep up with as the number of students and departments grows.

Manual mentoring systems have lack of centralized data storage, real-time access, structured reporting and may fail to work if there is increase in departments, student count, faculty mentors etc. So there is need of a digital tool which will help the coordinators and administrators to make institutional report easily to maintain the track of each student. So in order solve issues related to manual mentoring system, we are in state of proposing a smart web based student mentoring portal.

The portal supports a number of academic departments and uses role-based access control for students, administrators, coordinators, and mentors. In addition to centralizing mentoring data, the suggested framework makes it easier to track progress from semester to semester and evaluate performance in a more informal way. It also has automated report generation that looks like the way institutions do mentoring. The framework can support more departments without needing to change its architecture because it is flexible.


DOI: 10.48175/IJARSCT-32821

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## II. NEED OF PROJECT

Since more students are enrolling in different academic departments, institutional mentoring programs are becoming more diverse and complicated. Traditional mentoring systems that depend on paper-based documentation and manual record keeping are no longer useful for keeping records of a lot of academic work.

In a multi-departmental setting that includes computer engineering, mechanical engineering, electrical engineering, civil engineering, and mechatronics engineering, all programs must keep mentoring records in the same way. Keeping these records by yourself makes it more difficult to keep an eye on things from one department to the next and report on them at the institutional level.

Also, academic mentoring requires regular monitoring of performance in a number of areas, such as attendance, confidence, communication skills, and morale. The manual systems most of time fails in automated checking, secure storage, and structured performance visualization and it may be challenging to analyse the progress in long run. There is a growing institute need for following parameters,

To access student mentoring records digitally and in real-time.

To secure monitoring mechanism by assigning roles.

To automate the generation of various mentoring reports.

To make it scalable for large institutional departments.

To achieve these institutional requirements and needs, we are proposing a web based mentoring portal that help the institute to digitize their entire mentoring process while maintaining the required formats and documentation in a structured form as per institute.

## III. PROBLEM DEFINITION

As we have seen, most of colleges use the manual mentoring system and book keeping of student records in printed form. So each student has a printed form and has own folder with personal information, academic performance, semester achievements, improvement graphs and mentor comments and much more. Hence all things related to student are organized and maintained on paper which comes with lots of hurdles for student as well as faculty mentor. Manual system struggles with, no central storage tying all departments' together, real-time access that's basically impossible, constant worry over lost or misplaced papers, endless hours piecing together reports, zero visual tools for performance trends, little visibility for coordinators and admins.

So, the main aim is design and digitize the student mentoring system which will be scalable, role based, fully centralized, generates various reports, maintain student mentoring records, maintain their academic, co-curricular, extra-curricular activities records, semester performance, manage mentoring meetings.

## IV. LITERATURE REVIEW

**V. Tinto, *Leaving College: Rethinking the Causes and Cures of Student Attrition*, 2nd ed. Chicago, IL, USA: University of Chicago Press, 1993. "**This book tries to explain why students leave college before completing their degree and what steps can be taken by the institution to improve student retention. Institutions plays a vital role in creating a supportive environment, quality learning, setting goals. This altogether is a part of student's personal development."

**G. Crisp and I. Cruz, "Mentoring college students: A critical review of the literature between 1990 and 2007," *Research in Higher Education*, vol. 50, no. 6, pp. 525–545, 2009.** "This paper puts view on mentoring research to clarify the core mentoring means moreover it focuses on how it supports college students and what the existing difference between mentoring theory and research. Altogether it helps to better understand how mentoring works."

**M. Warschauer and D. Healey, "Computers and language learning: An overview," *Language Teaching*, vol. 31, no. 2, pp. 57–71, 1998.**

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"This paper explains the significance of internet-based interaction which allows learners to communicate with real-world users. So, in general the author wants to say that the language education will focus entirely on digital skills and meaningful use of technology into everyday learning."

**A. Al-Azawei, P. Parslow, and K. Lundqvist, "Barriers and opportunities of elearning implementation in higher education," *International Review of Research in Open and Distributed Learning*, vol. 18, no. 6, pp. 247–264, 2017.** "This paper suggests the current situation of digital learning as it adds up new opportunities and educational resources. After all of these benefits the paper tells us, that how few institutions lack infrastructure also limitation in technical support for implementation. Altogether, the author suggests that proper institutional development in technical environment will enhance digital learning."

**S. Kumar and M. Johnson, "Mentoring doctoral students online: Mentor strategies and challenges," *Mentoring & Tutoring: Partnership in Learning*, vol. 25, no. 2, pp. 202– 217, 2017.** "This paper explains that online doctoral mentoring helps students through guidance, structured interaction, and continuous feedback. It also highlights challenges such as communication barriers and student isolation, bringing the need for quality mentoring processes."

## V. METHODOLOGY TO SOLVE THE PROBLEM

Our proposed student mentoring system makes the use of three tier architecture. It was selected due to its certain features such as modularity, easy to maintain, ability to scale up. The architecture neatly separates all three layers which include Presentation layer, application layer and database layer.

### A. Presentation Layer

The presentation layer called as user interface layer is designed suing HTML5 and CSS4 with incorporating targeted java script for dynamic elements such as form validations, real time updates. It is used to deliver customized dashboards. It also used to student get a personal progress view of their profile, mentors can see their advices given to each student, and coordinators department wise mentoring data and administrators can manage system wide settings.

### B. Application Layer

Developed using PHP 8.x, this core layer controls all server-side operations such as,

- Session management and granular role-based authorization to prevent unauthorized actions.
- Secure routing with input sanitization and access validation at every endpoint.
- Data processing for form submissions, calculations, and automated report generation.
- Strict controls for semester-wise updates, locking past periods to avoid edits.
- File upload handling with size/type checks, virus scanning hooks, and storage optimization for proof documents such as certificates or photos.

The access control logic is role based where students can only view their own records, upload proof documents, reviews, comments given by their mentor. Departmental coordinators can generate department reports and monitor the activities of faculty mentor. Administrators can add/edit departments, users, assign batches to department coordinators so that they further allocate to faculty mentors.

### C. Database Layer

In our project we are using MySQL 8.0, this layer uses normalized relational tables to store and retrieve data efficiently. Key entities include:

- User management (profiles, roles, credentials hashed with bcrypt)
- Department records (with mappings to mentors and coordinators)
- Improvement chart tracking (trait scores over time)
- Semester-wise performance logs (structured by parameters like attendance, skills, morale)
- Secure references to uploaded proof files (stored in a dedicated directory with hashed names)

At the heart is the trait-based improvement module: For each student, it captures progress across Semesters I to VI, tied to specific metrics, culminating in an overall qualitative indicator (High, Good, Low, Poor).

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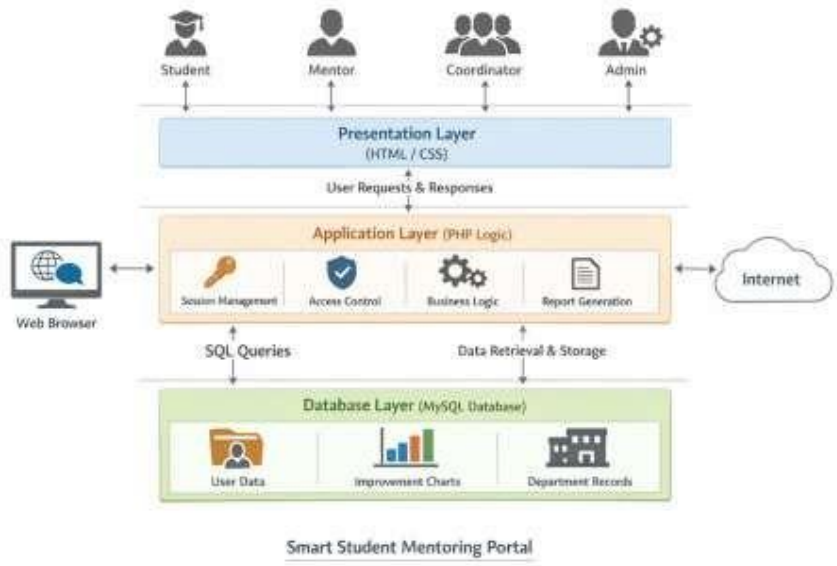


Figure 1: System Architecture for Student Mentoring System

## VI. OBJECTIVES OF PROPOSED WORK

To develop a digitized and centralized platform for student mentoring system.
To provide role based access to each end user such as to student, mentor, coordinator, and administrator.
To automate all mentoring record and its book keeping in digital form.
To generate all reports, records so that one can print if needed.

## VII. DETAILS OF DESIGN, WORKING AND PROCESSES

### 7.1 System Design Architecture

Our project student mentoring system makes the use of three-tier architecture includes presentation, application and database layer. We designed it as said because of its modularity, scalability and easy to maintain.
The presentation layer uses HTML5 and CSS3 with enough java script to generate UI and form interactive dashboards. Where these dashboards help the students, coordinators, administrators manage their workflows.
The Application Layer is built with PHP 8.x, takes care of the tasks like session handling to track who's logged in, core business logic for processing inputs, permission checks to lock down features, and on-the-fly content generation for reports and charts.
The Database Layer where we have MySQL which serves as the reliable relational backbone. Everything is organized in tables mentoring logs, improvement metrics, department setups, user accounts (with hashed passwords etc.

### 7.2 Working Mechanism

To keep operation smooth and secure our system follows a logical step by step flow.
User Authentication Process
When user log in to the system the PHP has a role to check credentials entered by the user are correct or wrong against the credentials we have in our MySQL table. If matches, we control the session holding user's ID and role. Each page loads checks two times for those sessions for blocking unauthorized access to the system.
Role-Based Access Control
Role dictates what you see and do:

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Students: View and edit only their own profile and uploads.
Mentors: Dive into assigned students' full records for reviews and notes.
Coordinators: See all students in their departments, with summary tools.
Administrators: Mode for adding departments, managing users.
Department-Level Data Management
Student records are directly tied to departments via foreign keys in the database. If you want to add a new department like AI Engineering, Just add a row to the departments table, no code changes are needed. It kept flexible for growing institutional needs.
Semester-Wise Data Processing
Progress of student gets recorded per semester. Records like attendance or skills; it has dedicated columns for Semester I through VI, with queries pulling data in strict chronological order. This feature will help you to track development of a student without missing a beat.

### 7.3 Improvement Chart Processing

This module makes the use of role based tracking of all for three year diploma cycle. For every student, we store scores on key academic/behavioural straight in the database.
Each student tracks:
Entries from Semester I to VI
A wrap-up qualitative rating (High, Good, Low, Poor)
PHP builds the chart dynamically, slapping on color codes (green for High, red for Poor) to make trends pop at a glance. Coordinators love it for quick academic health checks.

### 7.4 Automated Report Generation Process

Reports can be easy generated in our system, once you choose report you want to generate such as personal profile, semester score, mentor comments and remarks, proof documents uploaded. These reports can be on your figure tips.

### 7.5 File Upload and Verification Process

Students can easily upload their academic records, achievements along with the proof document for respective records. For validation PHP comes in the picture which checks file size, type and runs basic malware check for viruses and warms. While viewing reports, role is checked and as per the role one can generate the report.

## VIII. RESULTS AND APPLICATIONS


Figure 2: Login Interface

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The Figure 2 shows how system handles secure logins for everyone in the system. Enter your credentials and it cross-checks against the MySQL database, if successful, it sets up role-specific session.

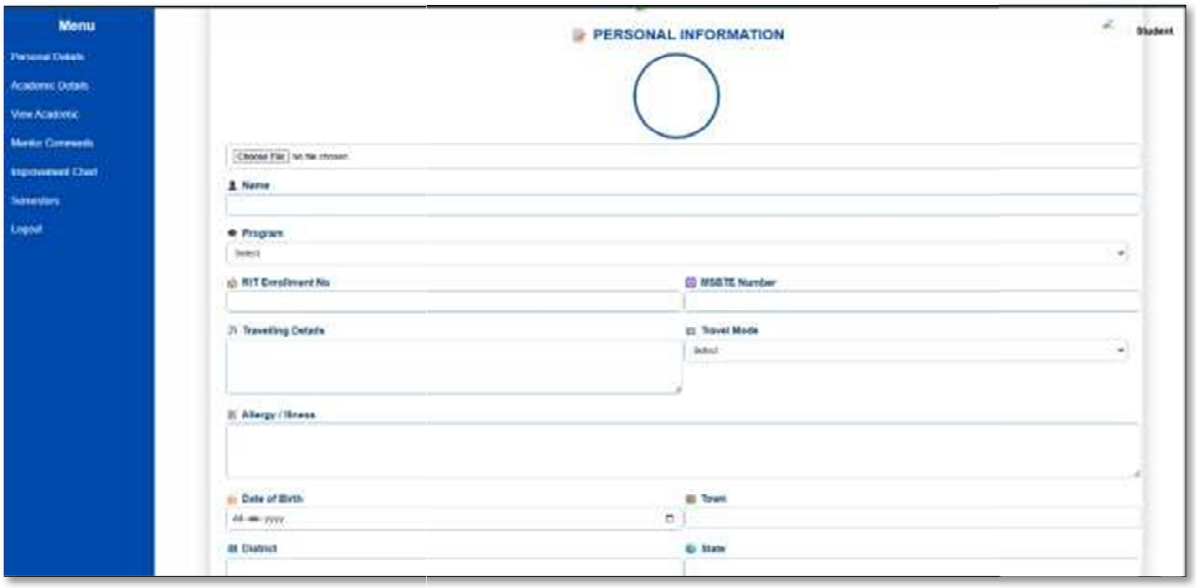


Figure 3: Student Dashboard

Figure 3 shows a form for students; he/ she can enter personal details of their academics and mentoring journey.

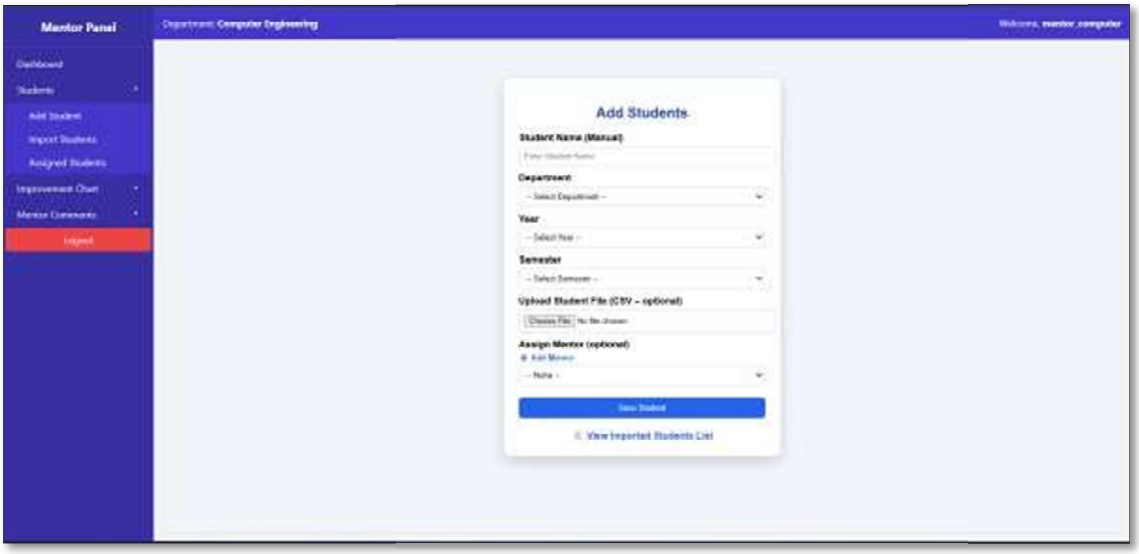


Figure 4: Mentor Dashboard

Figure 4 here mentors have authority to keep tabs on assigned students and maintain records. Easy access to tracking, performance updates, and a place to add comments or feedback.

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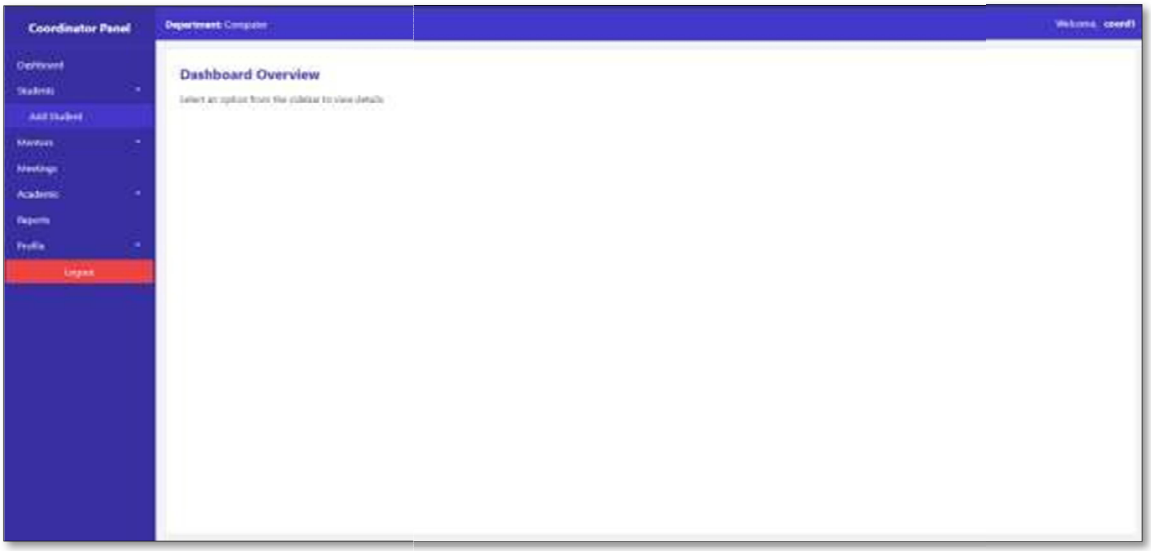


Figure 5: Coordinator Monitoring Panel

Coordinators use this Figure 5 for view across their department's mentoring data. It pulls everything together for overview, scaling to multiple departments.

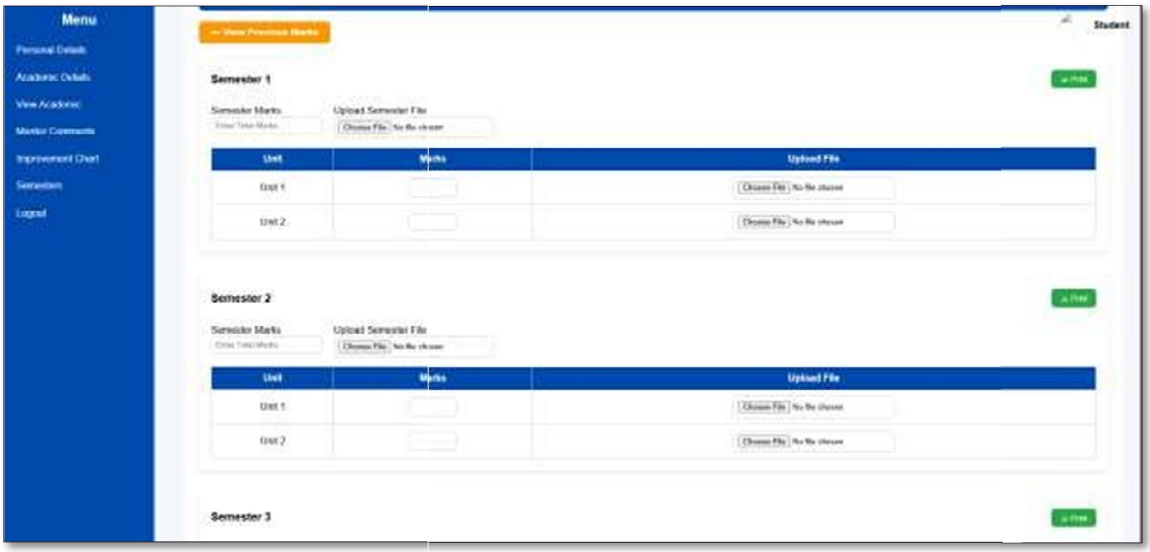


Figure 6: Student Academic Record

In this Figure 6, the student can record their unit-wise and semester-wise academic records also can attach their mark sheet.


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Figure 7: Improvement Chart Interface

Figure 7 here Improvement Chart module displays semester-wise record of academic and behaviour of student. This helps to maintain and track student's improvement throughout each semester.

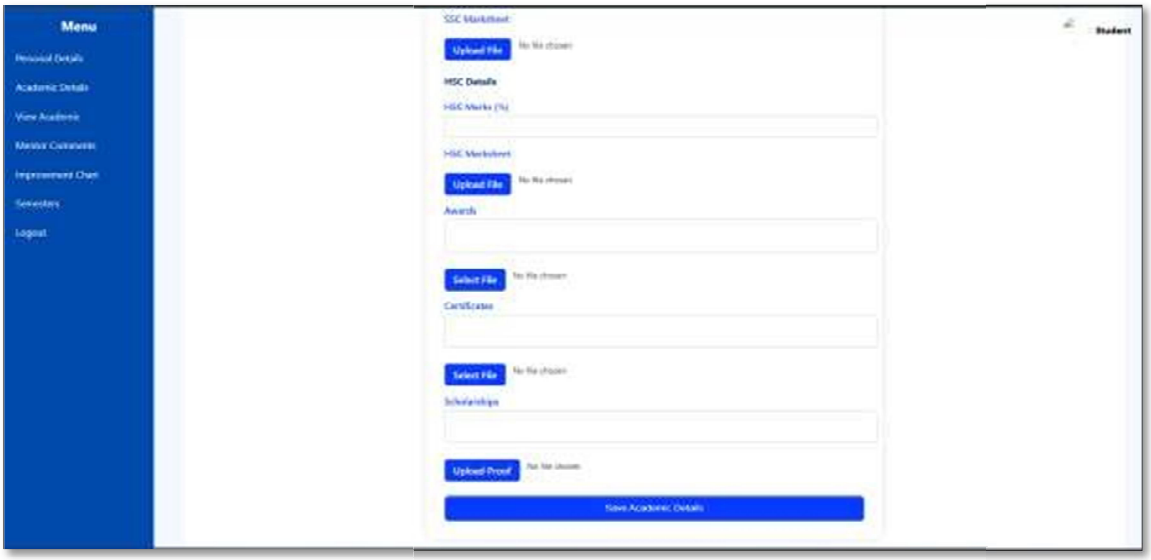


Figure 8: File Upload and Proof Verification Module

Figure 8 where student can enter their academic details and this also includes a functionality to upload files as a proof to record.


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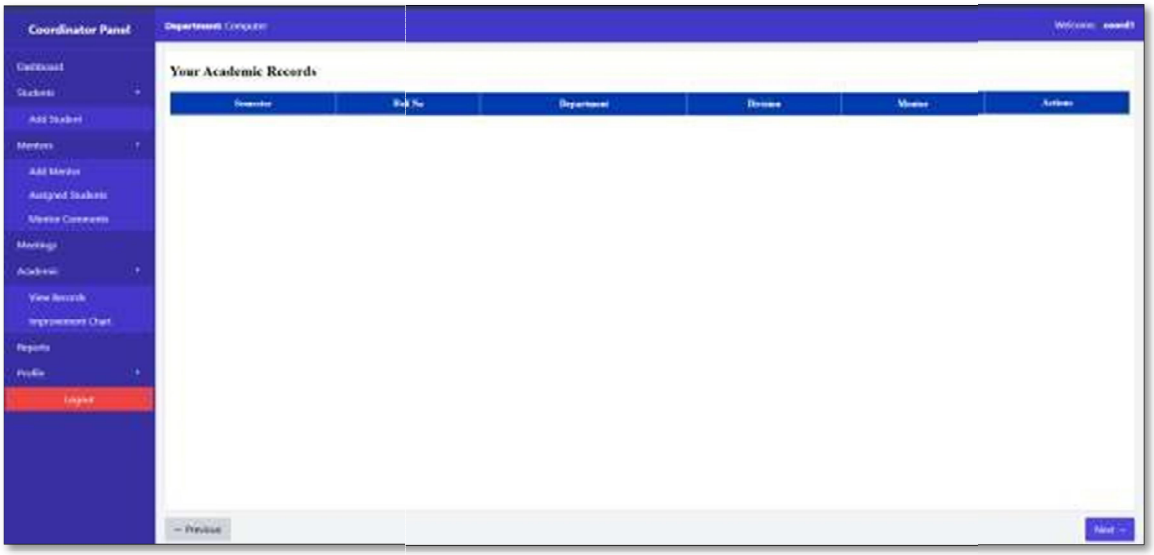


Figure 9: Department-Wise Student, Mentor Listing

Figure 9, this view lists students and mentors department wise. This helps to maintain long term details of assigned mentors for every department for each student

## IX. CONCLUSION

The developed student mentoring system is a reliable, scalable digital platform for mentoring students. It helps to remove our dependency on manual paper based mentoring. Streamline our all work centrally.

It helps to mentors, coordinators to track academic, behavioral performance of student. It helps to track the performance of a student in all aspects in his/her three year journey in diploma. Its role based access manages the dataflow and control over the records. The report generator enables the mentors to generate various reports easily.

Centralized dashboard helps all end users to manage their activities easily. It boosts scalability, accountability, availability regarding effective use of system. It modular nature sets a path for easy upgrade and update.

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