**A**

**Report On**

**Project Phase- II**

# "Student Marks Evaluation Monitoring System"

**Dr. Babasaheb Ambedkar Technological University, Lonere**

In the partial fulfillment of the requirement for the B. Tech Degree in

Computer Science And Engineering

Submitted by


| | | |
|---|---|---|
| **1.** | **Muhammadsaad Juber Naikawadi** | **2167621242008** |
| **2.** | **Harshada Shashank Yadav** | **2167621242015** |
| **3.** | **Harshvardhan Bajirao Patil** | **2167621242028** |
| **4.** | **Shruti Shreekant Adhav** | **2167621242037** |


*Under the Guidance of*
***Internal Supervisor***
**Mrs. P. R. Bhosale**
***Assistant Professor NMCOE***


DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**Shri. Venkateshwara Shikshan Sanstha's**

## NANASAHEB MAHADIK COLLEGE OF ENGINEERING

**Peth, Tal: Walwa, Dist: Sangli. 415 407**


**(Academic Year: 2023-24)**

**Shri. Venkateshwara Shikshan Sanstha's**

# NANASAHEB MAHADIK COLLEGE OF ENGINEERING

**Peth, Tal: Walwa, Dist: Sangli. 415 407**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

# CERTIFICATE

**This is to certify that**

| | | |
|---|---|---|
| 1. | **Muhammadsaad Juber Naikawadi** | **2167621242008** |
| 2. | **Harshada Shashank Yadav** | **2167621242015** |
| 3. | **Harshvardhan Bajirao Patil** | **2167621242028** |
| 4. | **Shruti Shreekant Adhav** | **2167621242037** |

Final year students of Bachelor of Technology in Computer Science And Engineering have satisfactorily completed to Project Phase II on **"Student Marks Evaluation Monitoring System"** towards the partial fulfillment of the award of B. Tech in Computer Science And Engineering Degree as laid by the ***Dr. Babasaheb Ambedkar Technological University, Lonere*** for the academic year 2023-24.

| | | |
|---|---|---|
| **Mrs. P. R. Bhosale** | | **Mrs. N.V. Patil** |
| ***Internal Supervisor*** | ***External Supervisor*** | ***H.O.D*** |

| | |
|---|---|
| **Mrs. P. R. Bhosale** | **Prof. Dr. S. V. Anekar** |
| ***Project Coordinator*** | ***Principal*** |

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It gives us immense pleasure to express our gratitude to our external supervisor, for his esteemed guidance and supervision during the project.

We are deeply indebted to our internal supervisor, **Mrs. P. R. Bhosale**, Assistant Professor, Department of Computer Science And Engineering, NMCOE for her valuable guidance, constant encouragement, and constructive criticism throughout project work.

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| **Name** | **PRN** |
|---|---|
| Muhammadsaad Juber Naikwadi | 2167621242008 |
| Harshada Shashank Yadav | 2167621242015 |
| Harshvardhan Bajirao Patil | 2167621242028 |
| Shruti Shreekant Adhav | 2167621242037 |

# Abstract

This project aims to transform traditional assessment methods in educational institutions through automation, data management, and online communication. It tackles key challenges such as delayed feedback, manual data handling, and the lack of actionable performance insights. By collecting and analysing real-time data, the system provides personalized student guidance and data-driven support for educators and administrators. It enhances evaluation and streamlines communication among stakeholders via a WhatsApp notification system, offering insights aligned with academic standards and meeting modern administrative needs.

This paper presents the project's background, objectives, methodology, technology stack, and its strong potential to improve academic performance and student engagement in today's education landscape.

**Keywords:** *Smart Evaluation, Student Monitoring, Educational Analytics, Rule-Based Systems.*

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# CHAPTER 1
# Introduction

## 1.1 General

Educational institutions frequently encounter substantial difficulties in handling student evaluations. Conventional approaches predominantly depend on manual data management, which can result in inaccuracies, inefficiencies, and delays in delivering prompt feedback and assistance to students. These procedures are not only labour-intensive but also susceptible to human mistakes, leading to inconsistencies and a lack of up-to date insights into student performance over various semesters. Additionally, the lack of integrated systems obstructs effective tracking of historical data and the early identification of students who may be academically at risk. The Student Marks Evaluation Monitoring System has been specifically developed to tackle these challenges using an automated, data-centric platform that improves the evaluation process. This sophisticated system merges digital processing tools with a structured approach to streamline evaluation tasks, produce rule-based insights, and enhance communication among students, faculty, and parents.

## 1.2 Objectives

Main Objectives of the Project: attendance, and performance indicators with user-friendly interfaces tailored for students, faculty, and administrators.

• Establish a rule-based advisory system to pinpoint students in need of support and offer customized recommendations based on specified academic thresholds.

• Incorporate a chatbot to address common student inquiries and provide immediate assistance regarding academic progress and attendance.

• Facilitate automated notifications via WhatsApp, introduce gamification features, and utilize advanced analytics to enrich the overall evaluation experience.

• Ensure high-level data security with role-based access control and two-factor authentication.

• Implement the system in a dependable hosting environment to guarantee high availability and performance.

## 1.3 Problem Defination

Traditional student evaluation systems are plagued by inefficiencies such as manual data entry, delayed feedback, and the absence of predictive insights. These shortcomings hinder timely intervention and support for students who may be struggling academically. The Advanced Student Marks Evaluation System seeks to address these issues by automating the evaluation process, offering predictive analytics, and enhancing communication between students, faculty, and parents through advanced technology integration.

# CHAPTER 2
# Literature Review

1. **"Automated Student Assessment and Feedback Systems" – J. Park, E. Kim, and T. Nguyen (2017)**

This study investigates how automated systems can streamline student assessment and feedback. It explains how algorithm-based evaluation reduces manual effort and improves consistency in grading—without relying on complex computational learning models [1].

2. **"A Smart Student Monitoring System for Improving Academic Performance" – N. Kumar, R. Gupta, and S. Sharma (2018)**

This study introduces a student monitoring system designed to observe academic performance and deliver tailored feedback. It emphasizes the use of real-time data collection and analysis to identify learning patterns and support timely interventions. The research demonstrates the effectiveness of real-time data in improving outcomes without the use of AI technologies [2].

3. **"Smart Classroom Technologies for Improved Student Assessment" – P. Martinez, C. Garcia, and M. Rodriguez (2018)**

This study examines the implementation of smart classroom tools—including sensors, interactive boards, and real-time data systems—to enhance student monitoring. These technologies foster adaptive environments and support better tracking of student behaviour and academic performance [3].

4. **"Adaptive Learning Systems for Personalized Education" – H. Li, J. Chen,**

**and Z. Zhang (2019)**

This paper explores adaptive learning systems that personalize educational content using structured logic and feedback loops. The authors show how rule-based personalization enhances student engagement and academic achievement, aligning with the logic-driven personalization in our proposed system [4].

5. **"Gamification in Student Assessment: A Review of Past and Present" – F. Wilson, D. Lee, and J. Kim (2019)**

This review explores the use of gamification in student assessments, illustrating how game elements such as badges and leaderboards increase motivation and engagement, making the assessment process more interactive and enjoyable [5].

6. **"Real-Time Performance Monitoring in E-Learning Environments" – S. Patel, A. Kumar, and V. Singh (2020)**

This research focuses on software tools that provide real-time performance tracking in online learning environments. The study highlights how immediate feedback and data visualization improve student participation and learning effectiveness through efficient data pipelines and dashboards [6].

7. **"Leveraging Big Data for Student Success: An Overview" – M. Johnson, K. Lee, and L. Adams (2021)**

This article discusses the use of big data analytics to enhance student evaluation and support systems. It reviews data sources and analytical techniques used to identify at-risk students and deliver targeted interventions, showing the transformative potential of data-driven educational environments [7].

8. **"Blockchain Technology in Student Records Management" – R. Smith, L. Brown, and A. Clark (2022)**

This paper evaluates the role of blockchain technology in securely managing academic records. The authors describe how blockchain ensures data integrity, transparency, and

long-term availability, contributing to trustworthy and tamper-proof student record systems [8].

# CHAPTER 3
# Working

## 3.1 Proposed System

The **Student Marks Evaluation Monitoring System** is developed using a systematic, phased approach built on a strong conceptual foundation to ensure comprehensive and effective implementation. It ensures secure, scalable, and efficient handling of student performance data and communication with stakeholders.

The proposed system includes the following steps:

- The sender uploads the data to the system in an encrypted format.
- The uploaded data is processed and stored securely in a cloud-based environment.
- The receiver can retrieve and decrypt the data using a secure encryption algorithm.
- Data integrity is verified by comparing sender and receiver data.
- Accuracy of the received data is validated.

Additionally, the project's conceptual framework is structured around five key components:

## 3.2 System Architecture

The following architecture outlines the overall working of the system:

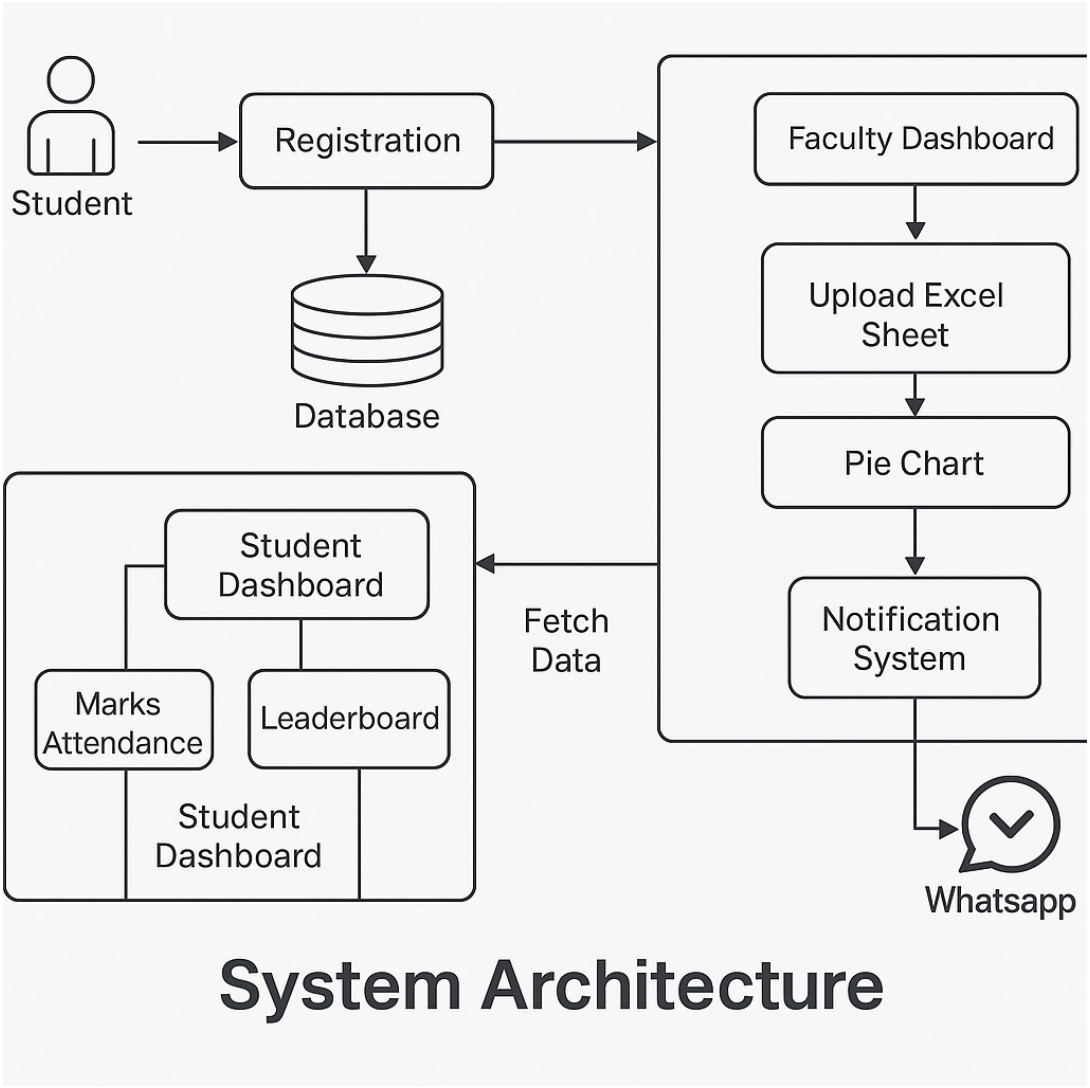


**Fig 3.1: System Architecture**

Key points:

- Student initiates the process by registering.
- Registration data is stored in the Database.
- The Faculty Dashboard has options to:
  - Upload Excel sheets (marks and attendance).
  - View student data in Pie Charts.
  - Use the Notification System to alert parents via WhatsApp.
- The Student Dashboard provides:

  - Visualization of marks and attendance.
  - Access to the Leaderboard.
  - Recommendations for improvement.

- The backend services run on Node.js and MongoDB for processing and storage.
- ReactJS renders a dynamic frontend interface.
- WhatsApp-web.js automates real-time communication with parents.

## 3.3 Data Flow Diagram

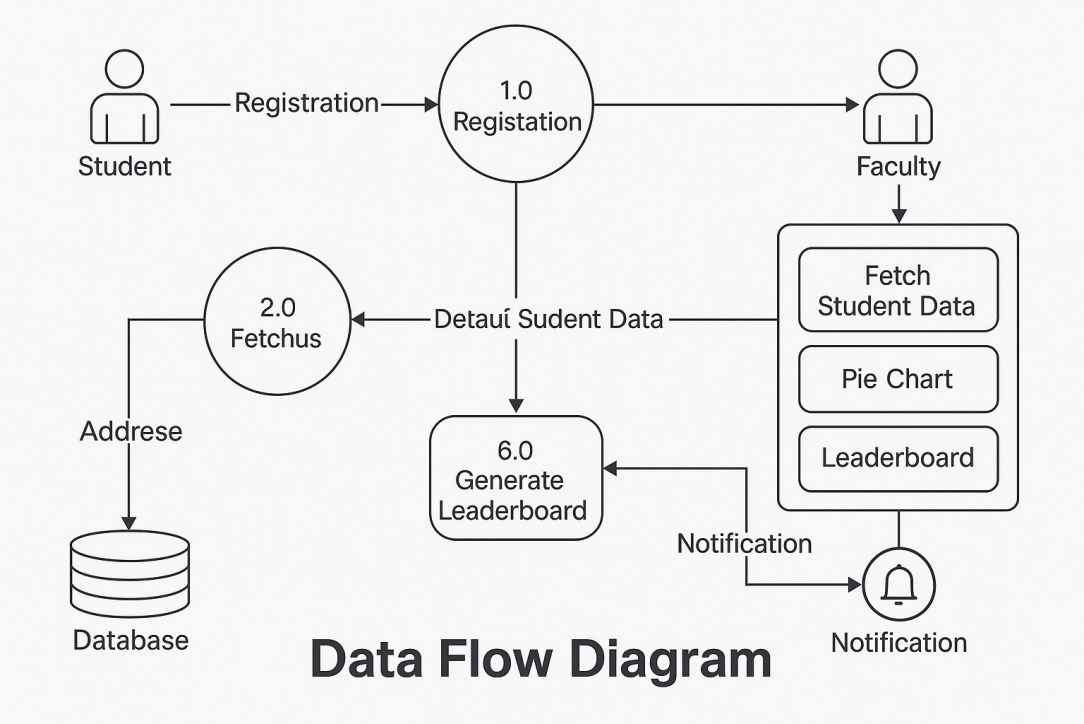


**Fig 3.2: Data Flow Diagram**

Explanation:

- Student submits registration data.
- Faculty logs in and selects class, semester, and year to fetch student data.
- Registration and academic data are stored in the MongoDB database.

- Faculty fetches student records through backend APIs.
- The system processes:
  - Excel data uploads (marks/attendance).
  - Data fetching for visualization (Pie Charts).
  - Leaderboard generation based on top scores.
- Processed data is sent to the frontend and rendered dynamically.
- The Notification module sends personalized messages to parents via WhatsApp.

## 3.4 Use Case Diagram

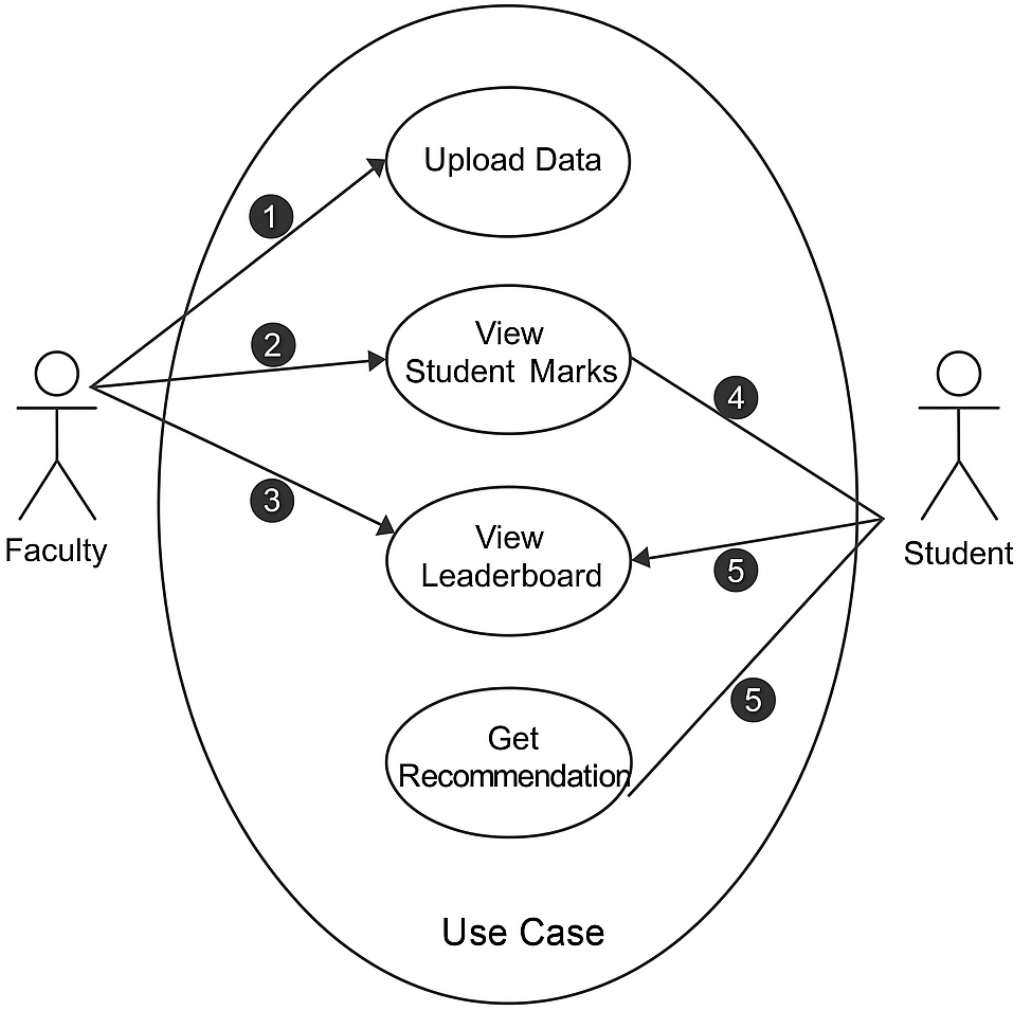

**Fig 3.3: Use Case Diagram**

This diagram illustrates the interactions between the actors (e.g., student, faculty ) and the system components such as upload, encryption, decryption, result viewing, and notification.

## 3.5 Software & Hardware Requirements

### Hardware Requirements

- Intel® Core™ i3/i5 Processor
- 4GB RAM (minimum)
- Color Monitor, Keyboard, Mouse
- Printer (Optional)

### Software Requirements

- Operating System: Windows 10 or higher
- Backend: Node.js, Express.js
- Frontend: ReactJS
- Database: MongoDB
- IDE: Visual Studio Code
- Browser: Chrome or Firefox
- Other: WhatsApp Web, npm, Git

## 3.6 Technology Used

### Node.js

An asynchronous, event-driven runtime environment used for scalable backend API development.

### ReactJS

A component-based library used for creating interactive, responsive user interfaces with fast rendering via virtual DOM.

### MongoDB

A NoSQL database used to store large volumes of semi-structured data like marksheets and evaluation records.

### WhatsApp-web.js

An automation library that integrates WhatsApp for sending real-time notifications, using local authentication to manage sessions.

### HTML, CSS, JavaScript

Core web technologies used to design and enhance the UI. HTML defines structure, CSS handles styling, and JavaScript adds interactivity.

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# CHAPTER 4
# Advantages and Applications

## 4.1 Advantages

The **Student Marks Evaluation Monitoring System** offers a range of benefits for students, faculty, and administrators. Key advantages include:

- **Real-Time Performance Tracking:** Faculty can access updated student marks, attendance, and assignment scores at any time, enabling continuous academic monitoring.
- **Rule-Based Personalization:** The system generates automated, personalized advisories based on performance thresholds, offering students actionable feedback and curated study resources.
- **Early Warning System:** Using simple rule-based logic, the system identifies students at academic risk without the need for complex AI models, enabling early interventions.
- **Enhanced Communication:** Integration with WhatsApp ensures real-time and personalized communication between faculty, students, and parents at no additional cost.
- **Administrative Efficiency:** Tasks like data entry, mark aggregation, and report generation are automated, reducing manual workload and increasing accuracy.
- **Informed Decision-Making:** Dashboards and analytics help educators and administrators make data-driven decisions related to curriculum, policy, and student support.

- **Scalability and Flexibility:** The system is designed to scale across institutions of various sizes, from K-12 schools to universities, and adapt to differing assessment structures.
- **Secure Data Management:** Role-based access and two-factor authentication ensure privacy and protection of sensitive student information, aligned with data regulations.

## 4.2 Applications

This system serves a wide array of practical purposes across educational ecosystems:

- **Academic Monitoring:** Enables faculty to continuously assess academic performance using real-time data.
- **Advisory Generation:** Issues automated advisories based on predefined thresholds. For example:
  - **¡10 marks:** Urgent advisory for direct faculty consultation.
  - **10–15 marks:** General advisory with links to study material (YouTube, Khan Academy, etc.).
- **Performance-Based Interventions:** Generates actionable insights to support struggling students before formal assessments.
- **Parent-Teacher Communication:** Keeps guardians informed via WhatsApp alerts related to marks, attendance, and announcements.
- **Data-Driven Management:** Assists school/university leadership in decision-making via structured reports and performance dashboards.
- **Multi-format Input:** Allows for uploading data in diverse formats (CSV, PDF) to support institutions with varying digital infrastructure.

## 4.3 Future Enhancement / Scope

The **Student Marks Evaluation Monitoring System** opens up a broad scope for enhancements to further benefit educational institutions:

- **AI-Based Predictive Analytics:** Future versions may incorporate AI to predict student outcomes, dropout risks, or subject-wise weaknesses.
- **Mobile App Development:** Companion Android/iOS applications for students and faculty for on-the-go monitoring and communication.
- **Integration with LMS Platforms:** Seamless integration with existing Learning Management Systems (e.g., Moodle, Google Classroom).
- **Blockchain for Result Authentication:** Use of blockchain to store results securely and immutably, enhancing credibility and verifiability of academic records.
- **Multi-language Support:** Adding regional and international language support to increase accessibility in diverse linguistic environments.
- **Gamification of Advisories:** Transforming feedback into gamified tasks to improve student engagement with remedial content.
- **Voice Assistant Integration:** Enabling voice-based queries for students and faculty through assistants like Alexa or Google Assistant.

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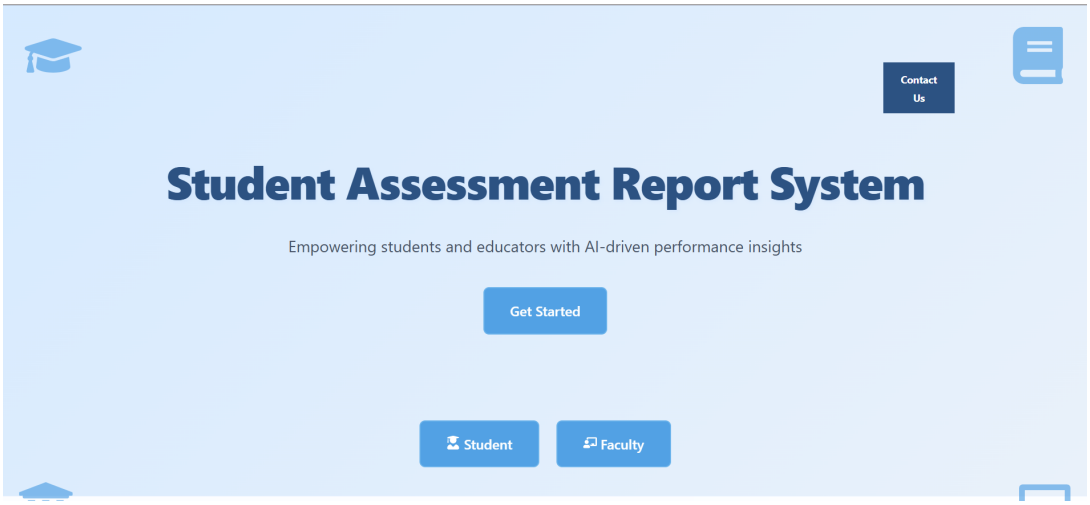
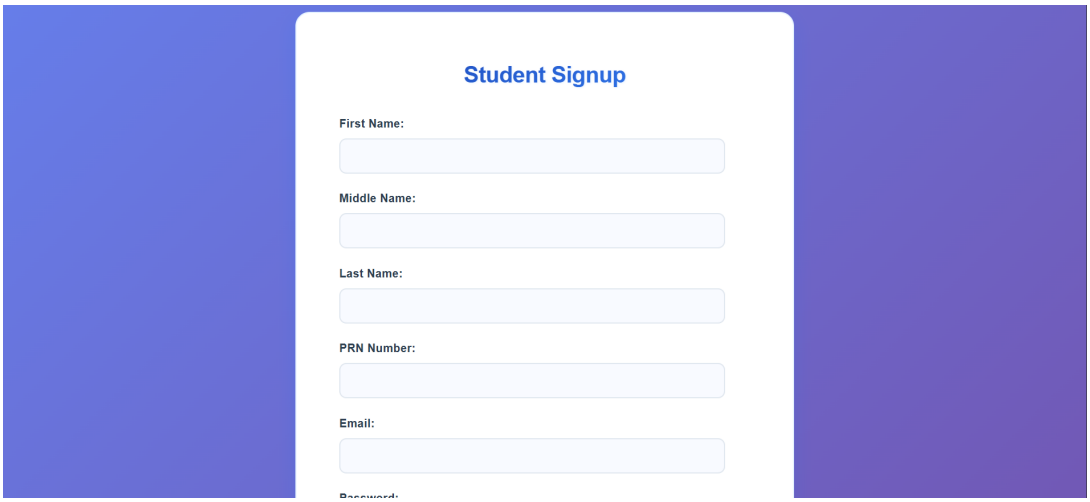
# CHAPTER 5
# Result & Discussions

## 5.1 Home Page



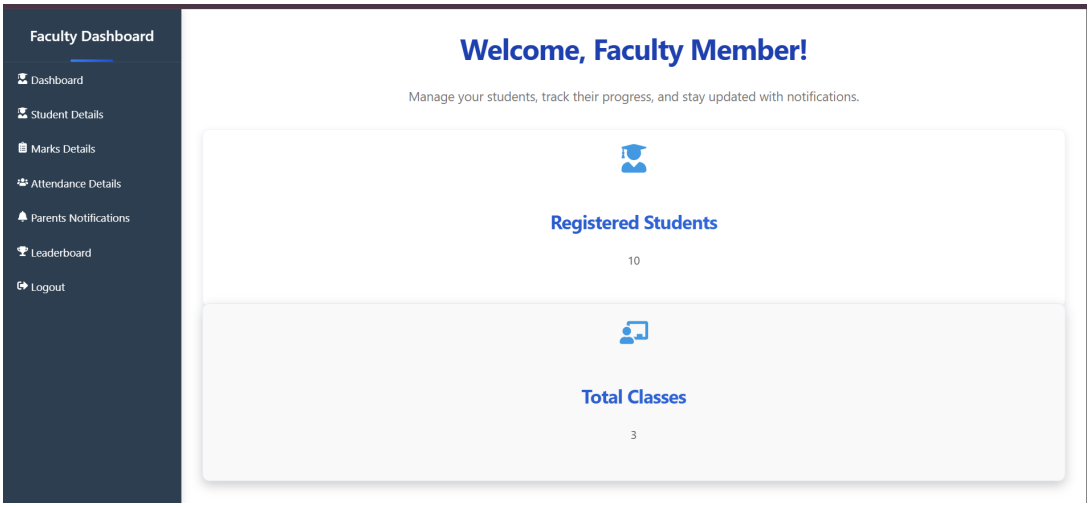

This is the main landing page of the system where users can log in or register based on their role.

## 5.2 Student Registration Page



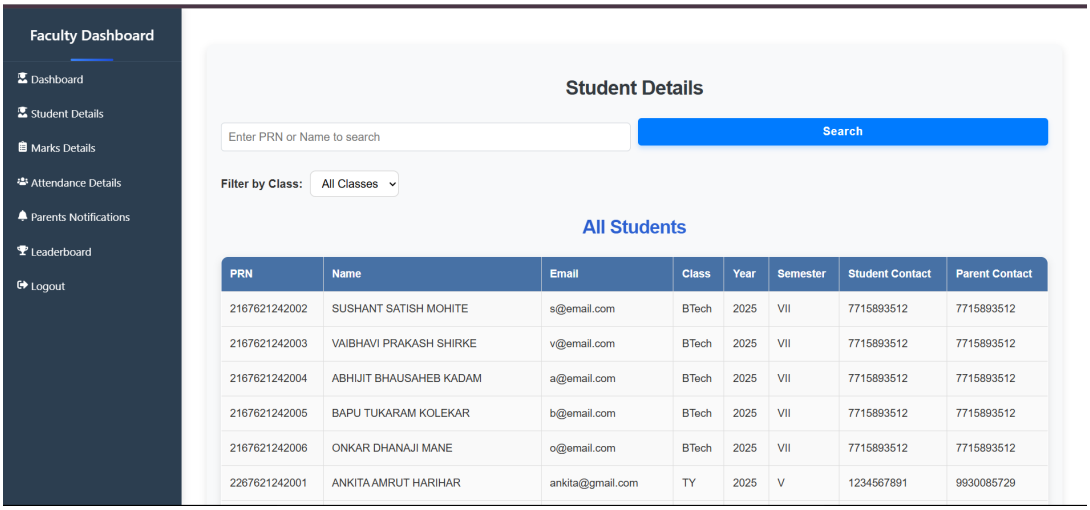

Students can register by providing personal and academic details for system access.

## 5.3 Faculty Dashboard



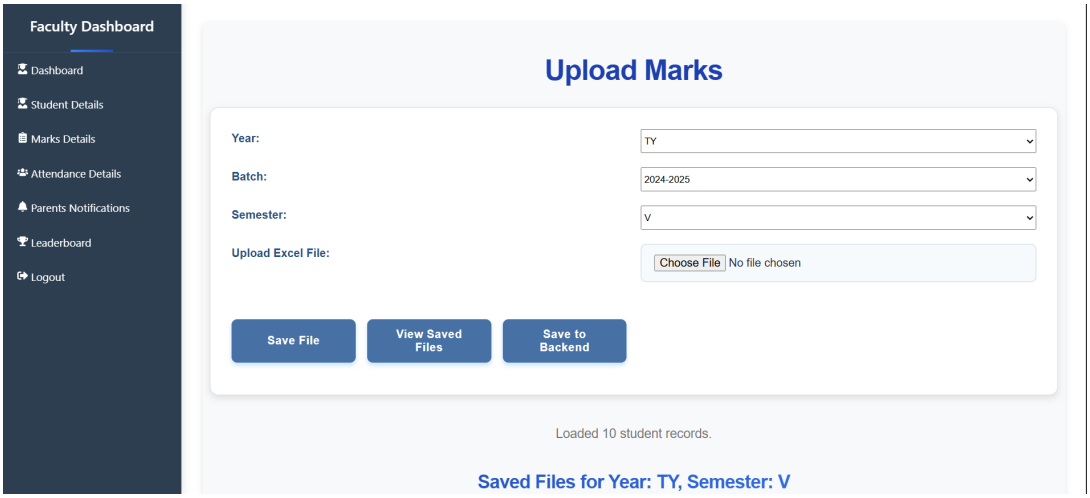

The faculty dashboard provides quick access to functionalities such as uploading data and viewing student performance.

## 5.4 Students Details



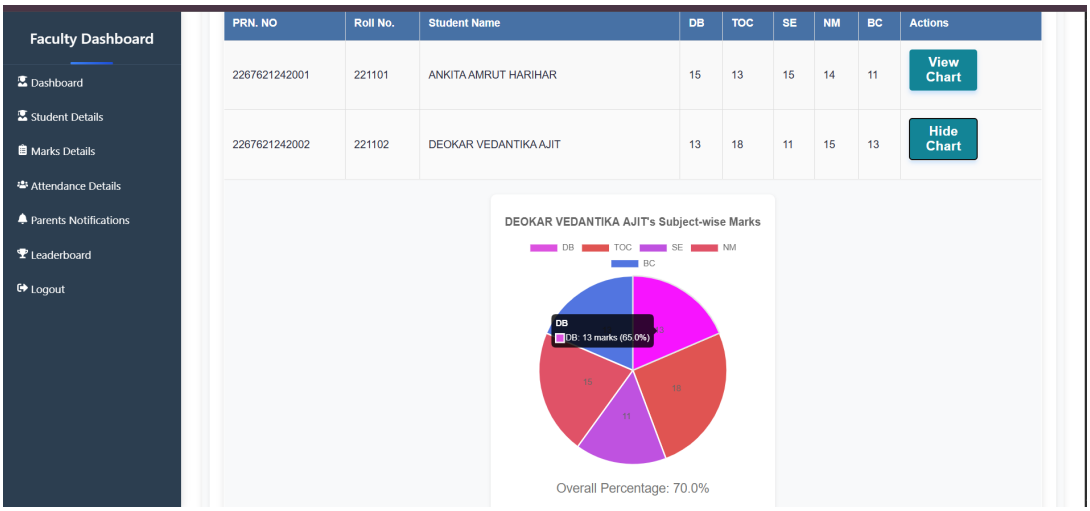

This section lists all registered students with basic details for faculty review.

## 5.5 Upload Marks Sheet



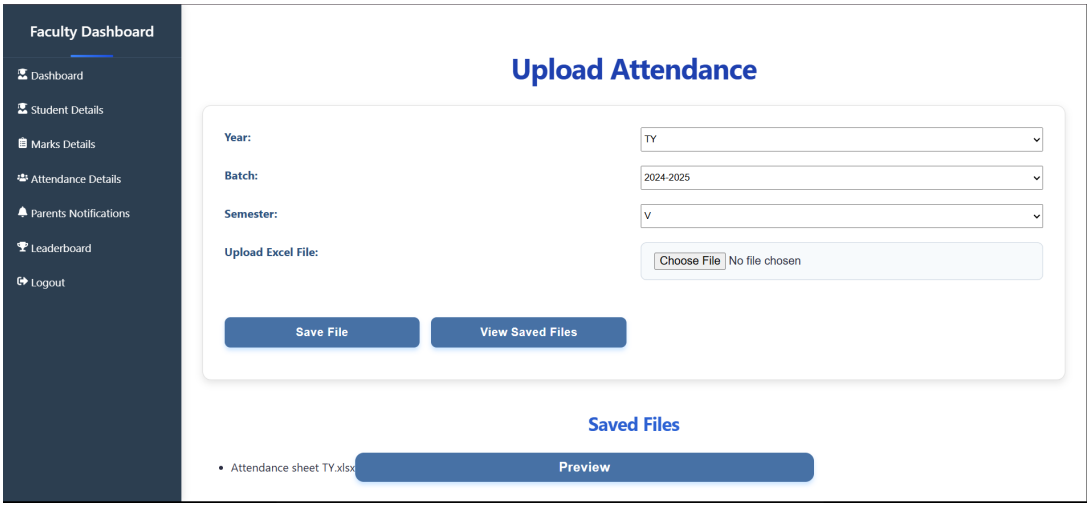

Faculty can upload mark sheets for different subjects to the system for analysis.

## 5.6 Preview the Marks



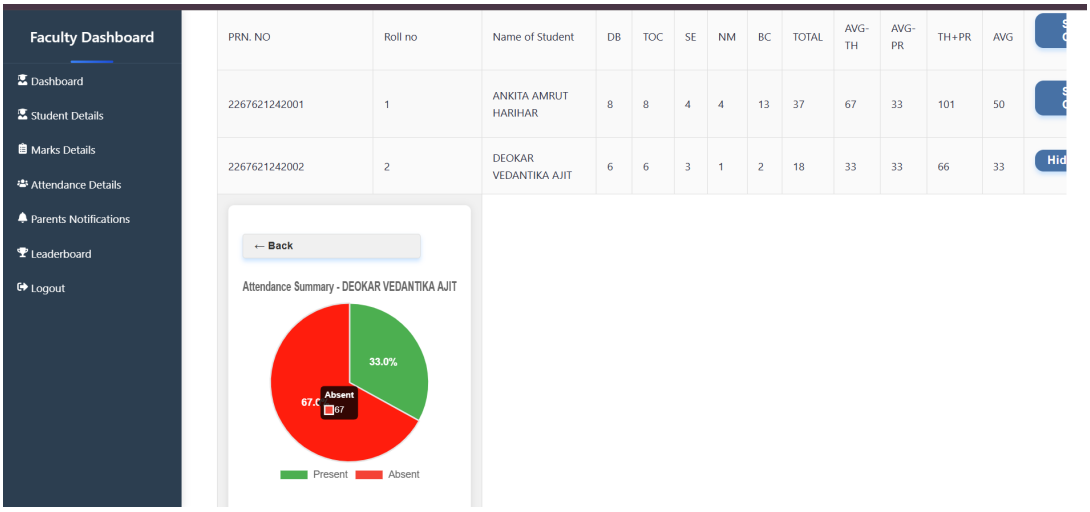

A preview of the uploaded marks allows faculty to verify data before final submission.

## 5.7 Upload Attendance Sheet



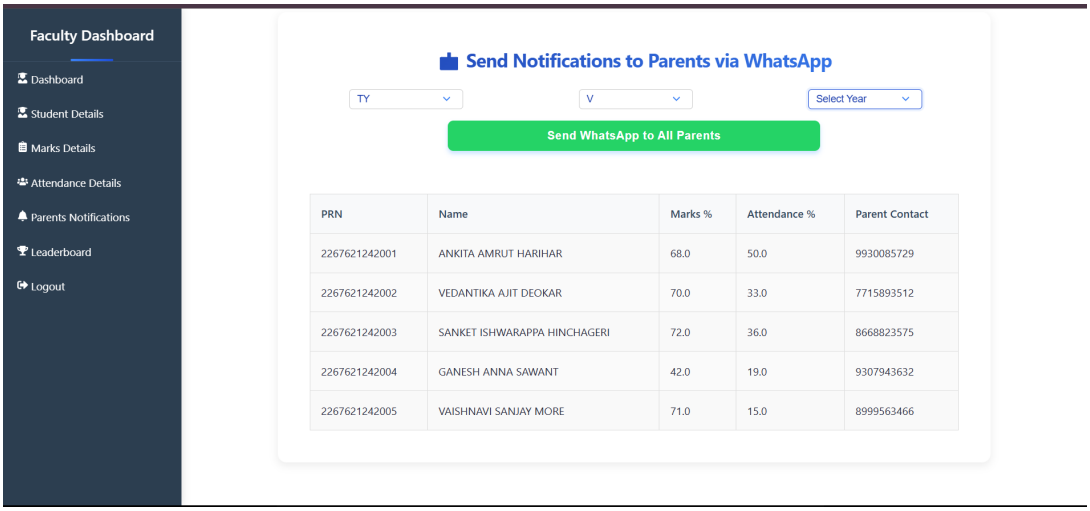

Attendance records can be uploaded here, which are used for monitoring student presence.

## 5.8 Preview the Attendance




Faculty can preview the uploaded attendance data to ensure accuracy.

## 5.9 Send Message to Parents via WhatsApp

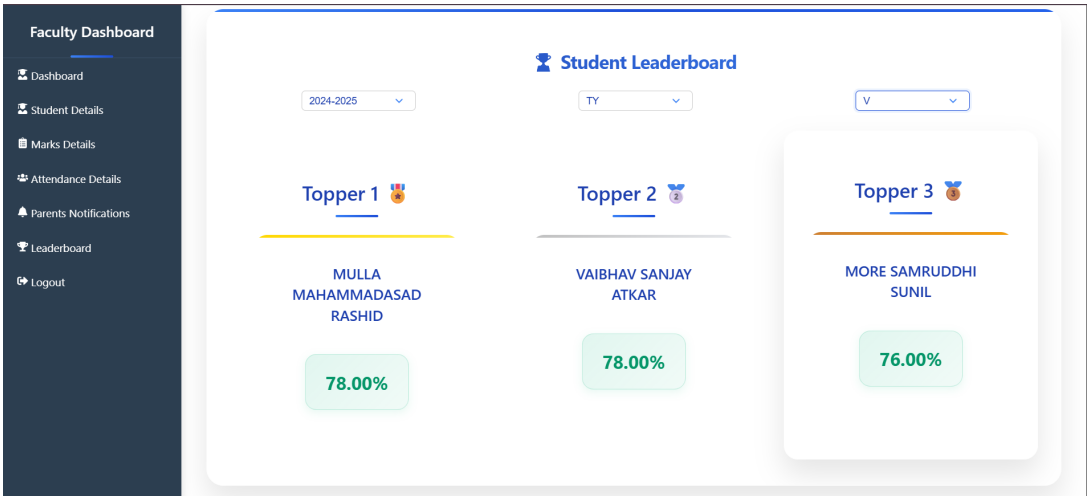



Personalized notifications can be sent to parents regarding academic performance and attendance.

## 5.10 Message on WhatsApp

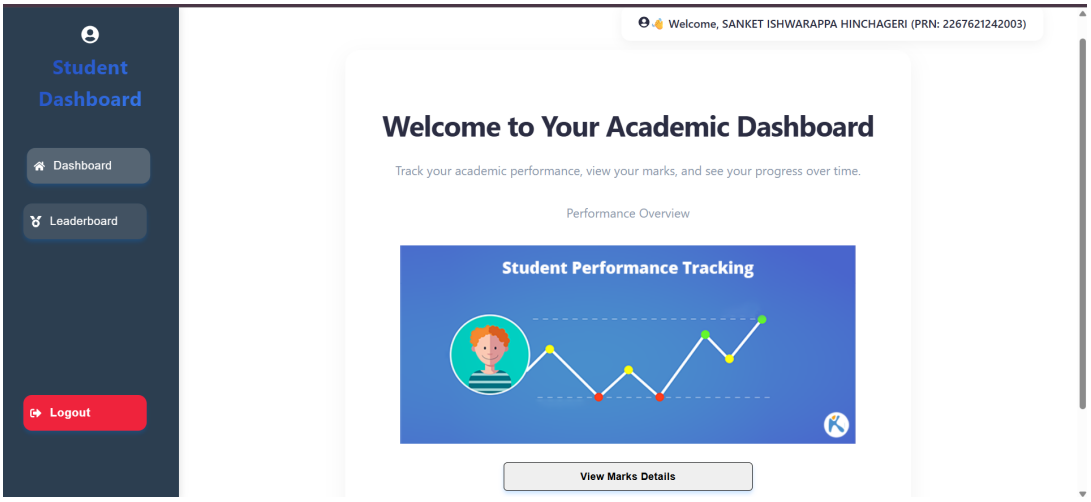

An example of how the notification appears on the parent's WhatsApp application.

## 5.11 Leaderboard



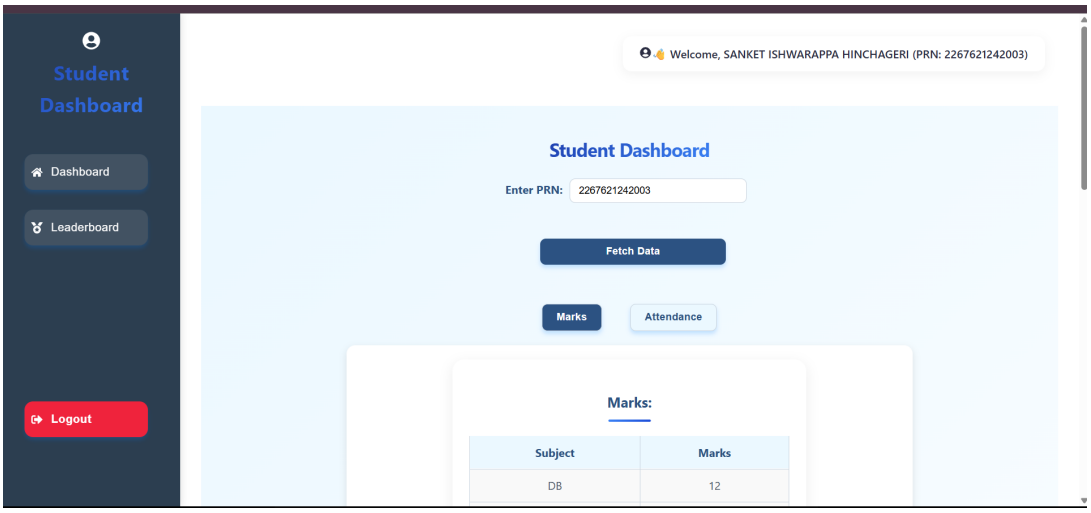

Displays top-performing students in a leaderboard format to encourage healthy competition.

## 5.12 Student Dashboard



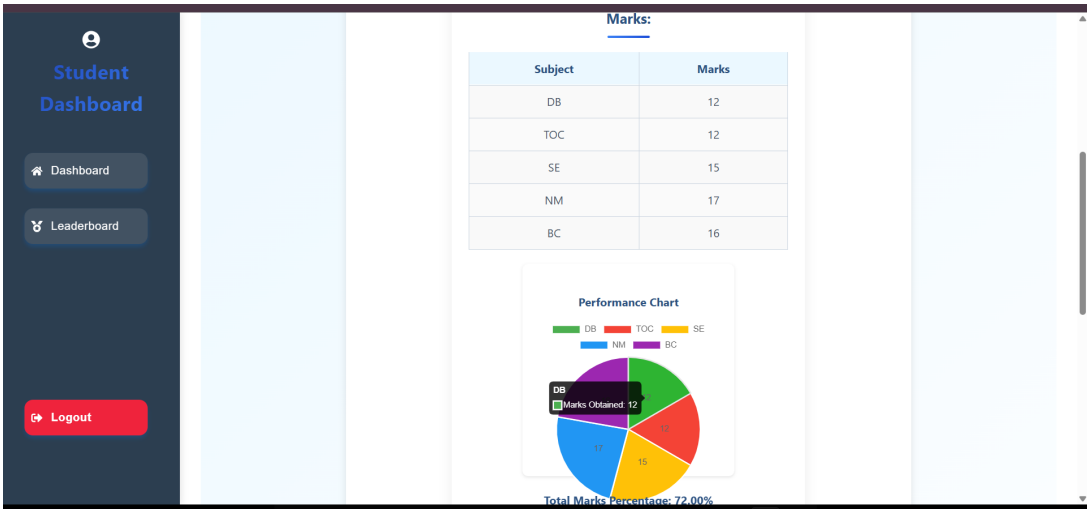

The student's personal dashboard to view performance statistics and advisories.

## 5.13 Student Data Fetch by PRN Number



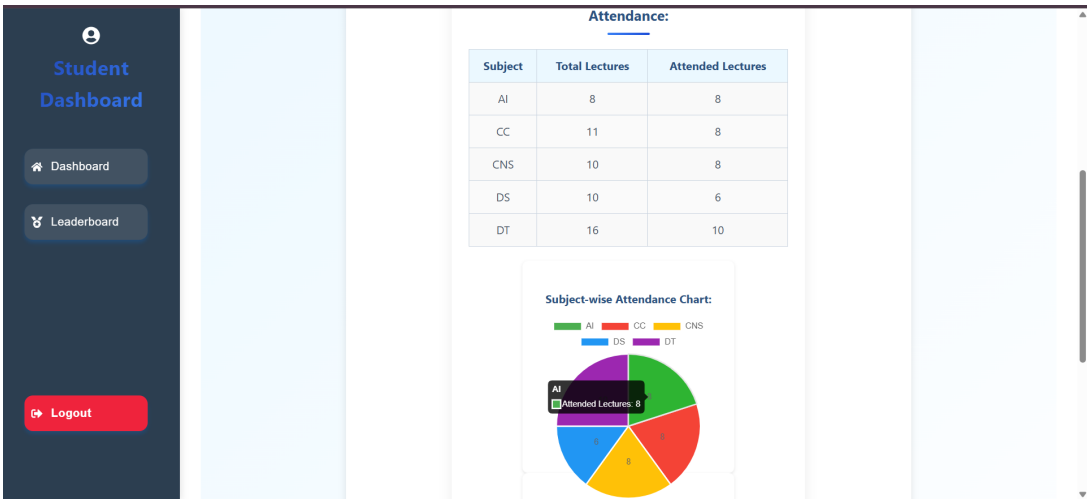

Students can fetch their performance details using their PRN number.

## 5.14 Visualization of Marks



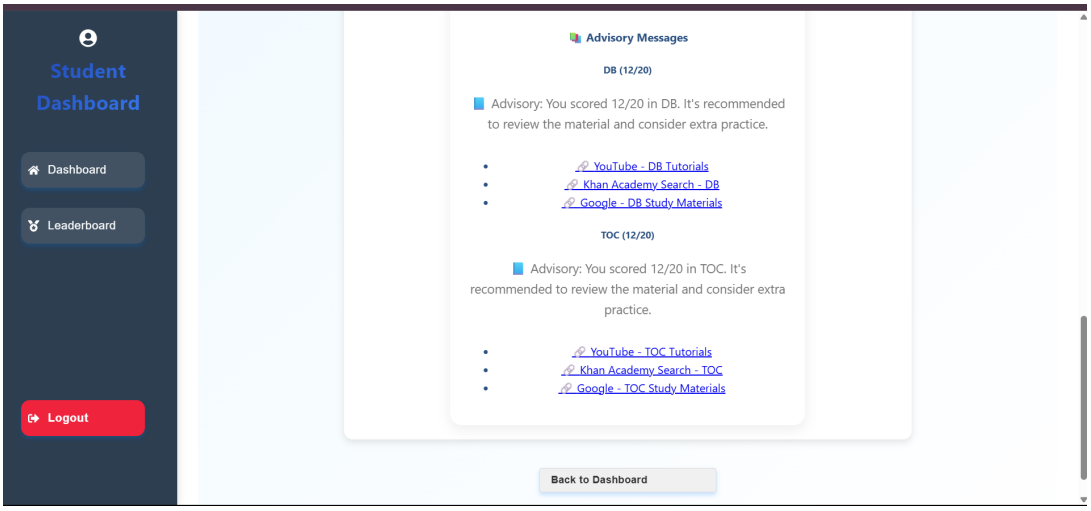

Graphical representation of marks helps students visualize their academic progress.

## 5.15 Visualization of Attendance




Attendance data is shown visually to easily identify attendance trends and gaps.

## 5.16 Recommendation on Marks




Based on performance, the system generates personalized study recommendations.

# Conclusion

The Student Marks Evaluation Monitoring System marks a significant leap forward in educational assessment by automating various processes, enhancing accuracy, and offering access to real-time data. This groundbreaking system effectively tackles persistent issues found in traditional evaluation methods, such as the challenges of manual data processing, delayed feedback, and the absence of organized, proactive insights. By utilizing powerful digital tools and rule-based logic, the system provides a comprehensive platform that improves communication, delivers actionable advisories, and simplifies administrative tasks. Its ability to conduct structured analytics and facilitate rule-based identification empowers educators and administrators to make data-driven choices and take proactive steps to support student success. The automated WhatsApp communication features create a more interconnected and responsive educational atmosphere.

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# References

[1] *Automated Student Assessment and Feedback Systems* – J. Park, E. Kim, and T. Nguyen (2017)

[2] *A Smart Student Monitoring System for Improving Academic Performance* – N. Kumar, R. Gupta, and S. Sharma (2018)

[3] *Smart Classroom Technologies for Improved Student Assessment* – P. Martinez, C. Garcia, and M. Rodriguez (2018)

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[6] *Real-Time Performance Monitoring in E-Learning Environments* – S. Patel, A. Kumar, and V. Singh (2020)

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