University Management System

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Abstract

The University Management System (UMS) is an integrated, web-based platform developed to enhance the efficiency and effectiveness of university operations by automating key administrative, academic, and financial processes. The system provides a centralized database and user-friendly interfaces for stakeholders, including students, faculty, administrators, and management, to manage tasks such as student enrollment, course registration, fee management, examination scheduling, result processing, and attendance tracking. Additionally, UMS facilitates communication through features like notifications, email integration, and reporting tools. By leveraging modern technologies such as cloud computing and secure authentication protocols, the system ensures scalability, data security, and accessibility. The implementation of UMS aims to reduce manual workload, minimize errors, and improve decision-making through real-time data analytics, thereby fostering a more organized and transparent academic environment.

1 Introduction

1.1 Problem Statement

Universities face significant challenges in managing their administrative, academic, and operational processes due to reliance on manual or fragmented systems. These inefficiencies lead to issues such as time-consuming student enrollment, inaccurate record-keeping, delayed result processing, and poor communication between stakeholders like students, faculty, and administrators. Existing systems often lack integration, scalability, and real-time data access, resulting in errors, redundant efforts, and limited transparency. There is a critical need for a comprehensive, automated University Management System (UMS) that streamlines processes, ensures data accuracy, enhances accessibility, and improves decision-making through centralized management and real-time analytics.

1.2 Why is it an Important Problem?

The problem addressed by the University Management System (UMS) is significant for several reasons, as it impacts the efficiency, quality, and overall functioning of higher education institutions. Below are the key reasons why this problem is important:

Operational Inefficiency: Manual or fragmented systems for tasks like enrollment, course management, and result processing are time-consuming and prone to errors. This inefficiency burdens staff, delays critical processes, and hampers the university's ability to operate smoothly, affecting thousands of students and faculty.

Data Inaccuracy and Redundancy: Disparate systems or paper-based records often lead to inconsistent data, misplaced records, or duplicate entries. Accurate and centralized data is essential for academic integrity, financial accountability, and compliance with regulatory requirements.

Poor Stakeholder Experience: Students, faculty, and administrators face challenges due to lack of real-time access to information, such as course schedules, grades, or fee status. This results in frustration, miscommunication, and reduced satisfaction among stakeholders.

Scalability Challenges: As universities grow in size and complexity, manual or outdated systems struggle to accommodate increasing numbers of students, courses, and administrative tasks. A scalable solution is critical to support expansion and modernization.

Decision-Making Limitations: Without real-time analytics and centralized data, university management cannot make informed decisions on resource allocation, academic performance, or strategic planning. This hinders institutional growth and competitiveness.

Transparency and Accountability: Fragmented systems reduce transparency in processes like fee collection, examination results, or attendance tracking, potentially leading to mistrust among stakeholders or non-compliance with accreditation standards.

2 Requirements

2.1 Expected Requirements: Students and Teachers Information

Description and priority Information regarding students, teachers and courses are stored in the database. Every user can view only certain information based on their user class. For example, a teacher can view student and course information that they are handling. This feature is of high priority as the information must be viewed by only the authorized users.

Functional requirements

- Each user shall be able to view information in the database based on their user class.
- The administrator shall be able to view all the information in the database.

2.2 Normal Requirements: Attendance and Marks Entry

Description and priority Attendance and marks entry is the main feature of the University Management System. Hence, the priority is high. Teachers update the attendance and marks of the students who are part of her class. Students can view their respective Attendance and marks of the courses they have taken.

Functional requirements

- Teachers shall be able to view, update and edit the attendance and marks of the students, part of their class.
- Teacher shall be able to take extra classes, switch classes with other teachers.

2.3 Operating System Requirements

The operating environment for University Management System are listed below:

- Database: MySQL database
- Front end: HTML/CSS
- Back end: Django

3 System Design

3.1 Student

Each student belongs to a class identified by semester and section. Each class belongs to a department and is assigned a set of courses. Therefore, these courses are common to all students of that class. The students are given a unique username and password to login. Each of them will have a different view. These views are described below.

- **Student information**
  Each student can view only their own personal information. This includes their personal details like name, phone number, address etc. Also, they can view the courses they are enrolled in and the attendance marks of each of those.

- **Attendance information**
  Attendance for each course will be displayed. This includes the number of classes attended and the attendance percentage. If the attendance percentage if below a specified threshold, say 75%, It will be marked in red otherwise it be in green. There will also be a day-wise attendance view for each course which shows the date and status. This will be presented in a calendar format.

- **Marks information**
  There will be 5 events and 1 semester end examination for each course. The marks for each of these will be provided in the ERP system.

3.2 Teacher

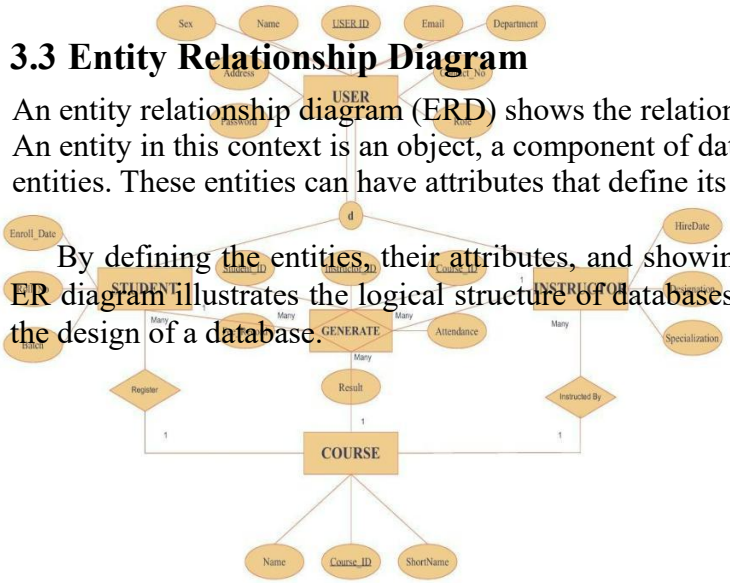
Each teacher belongs to a department and is assigned to classes with a course. Teachers will also have a username and password to login. The different views for teachers are described below. • Information The teachers will have access to information regarding the courses and classes they are assigned to. Details of the courses include the credits, the syllabus plan. Details of the class include the department, semester, section and the list of students each class.

- **Attendance**
  The teacher has the ability to add and also edit the attendance of each student. For entering the attendance, they will be given the list of students in each class and they can enter the attendance of the whole class on a day to day basis. There will be two radio buttons next to each student name, one for present and the other for absent. There will also be an option for extra classes. Teachers can edit the attendance of each student either for each student individually or for the whole class.

- **Marks**
  The teacher can enter the marks for the 5 events and 1 SEE for each course they are assigned. They also have the ability to edit the marks in case of any changes. Reports such as the report card including all the marks and CGPA of a student can be generated.

3.3 Entity Relationship Diagram

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties.



By defining the entities, their attributes, and showing the relationships between them, an ER diagram illustrates the logical structure of databases. ER diagrams are used to sketch out the design of a database.

Figure 1: Entity Relationship diagram of University Management System

3.4 Relational Diagram

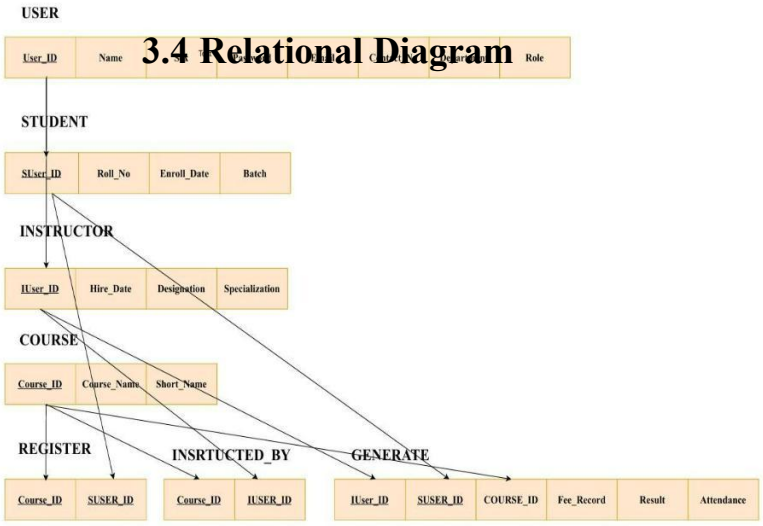


Figure 2: Relational diagram of University Management System

4 Modules in the System

The University Management System has two main user classes. These include the students and teachers. This section will explain in detail all the features and the working of those for each user class.

4.1 Student

4.1.1 Login

Each student in the college is assigned a unique username and password by the admin- istrator. The username is the same as their USN and so is the password. They may change it later according to their wish.

4.1.2 Homepage

After successful login, the student is presented a homepage with their main sections, attendance, marks and timetable. In the attendance section the student can view their attendance status which includes the total classes, attended classes and the attendance percentage for each of their courses.

In the marks section, the student can view the marks for each of their courses out of 20 for 3 internal assessments, 2 events. Also, the semester end examination for 100 marks. Lastly, the timetable provides the classes assigned to that student and day and time of each in a tabular form.

4.1.3 Attendance

On the attendance page, there is a list of courses that is dependent on each student. For each course, the course id and name are display along with the attended classes, total classes and the attendance percentage for that particular course. If the attendance per- centage is below 75 for any course, it is displayed in red denoting shortage of attendance, otherwise it is green. If there is any shortage, it specifies the number of classes to attend to make up for it. If you click on each course, it takes you to the attendance detail page.

4.1.4 Attendance Detail

This page displays more details for the attendance in each course. For each the course, there is a list of classes conducted and each is marked with the date, day and whether the student was present or absent on that particular date.

4.1.5 Marks

The Marks page is a table with an entry for each of their courses. The course id and name are specified along the marks obtained in each of the tests and exams. The tests include 3 internal assessments with marks obtained out of a total of 20, 2 events such as project, assignment, quiz etc., with marks out of 20. Lastly, one semester end exam with marks out of 100.

4.1.6 Timetable

This page is a table which lists the day and timings of each of the classes assigned to the student. The row headers are the days of the week and the column headers are the time slots. So, for each day, it specifies the classes in the time slots. The timetable is generated automatically from

the assign table, which is a table containing the information of all the teachers assigned to a class with a course and the timings the classes.

4.2 Teacher

4.2.1 Login

Each teacher in the college is assigned a unique username and password by the adminis- trator. The username is their teacher ID and the same for password. The teacher may change the password later.

4.2.2 Homepage

After successful login, the student is presented a homepage with their main sections, attendance, marks, timetable and reports. In the attendance section, the teacher can enter the attendance of their respective students for the days on which classes were conducted. There is a provision to enter extra classes and view/edit the attendance of each individual student. In the marks section, the teacher may enter the marks for 3 internals, 2 events and 1 SEE for each student. They can also edit each of the entered marks. The timetable provides the classes assigned to the teacher with the day and timings in a tabular form. Lastly, the teacher can generate reports for each of their assigned class.

4.2.3 Attendance

There is a list of all the class assigned to teacher. So, for each class there are 3 actions available. They are,

4.2.4 Enter Attendance

On this page, the classes scheduled or conducted is listed in the form of a list. Initially, all the scheduled classes will be listed from the start of the semester to the current date. Thus, if there is class scheduled for today, it will automatically appear on top of the list. If the attendance of any day is not marked it will be red, otherwise green if marked. Classes can also be cancelled which will make that date as yellow. While entering the attendance, the list of students in that class is listed and there are two options next to each. These options are in the form of a radio button for present and absent. All the buttons are initially marked as present and the teacher just needs to change for the absent students.

4.2.5 Edit Attendance

After entering attendance, the teacher can also edit it. It is similar to screen for entering attendance, only the entered attendance is saved and display. The teacher can change the appropriate attendance and save it.

4.2.6 Student Attendance

For each assigned class, the teacher can view the attendance status of the list of students. The number of attended classes, total number of classes conducted and the attendance

percentage is displayed. If the attendance percentage of any of the students is below 75, it will be displayed in red. Thus, the teacher may easily find the list of students not eligible to take a test.

4.2.7 Marks

On this page, the list of classes assigned to the teacher are displayed along with two actions for each class. These actions are,

4.2.8 Enter Marks

On this page, the teacher can enter the marks for 3 internal assessments, 2 events and one semester end exam. Initially all of them are marked red to denote that the marks have not been entered yet. Once the marks for a test is entered, it turns green. While entering the marks for a particular test, the list of students in that class is listed and marks can be entered for all of them and submitted. Once, the marks are submitted, the students can view their respective marks. Incase if there is a need to change the marks of any student, it is possible to edit the marks.

5 Screenshots of the implemented system

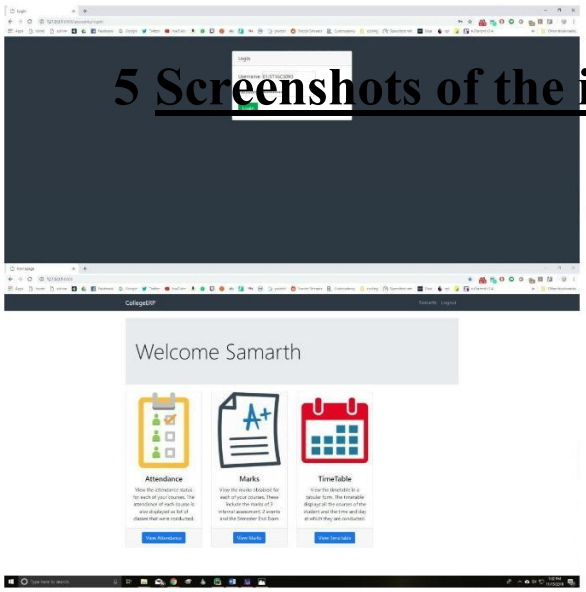


Figure 3: Student Login Page

Figure 4: Student Home Page

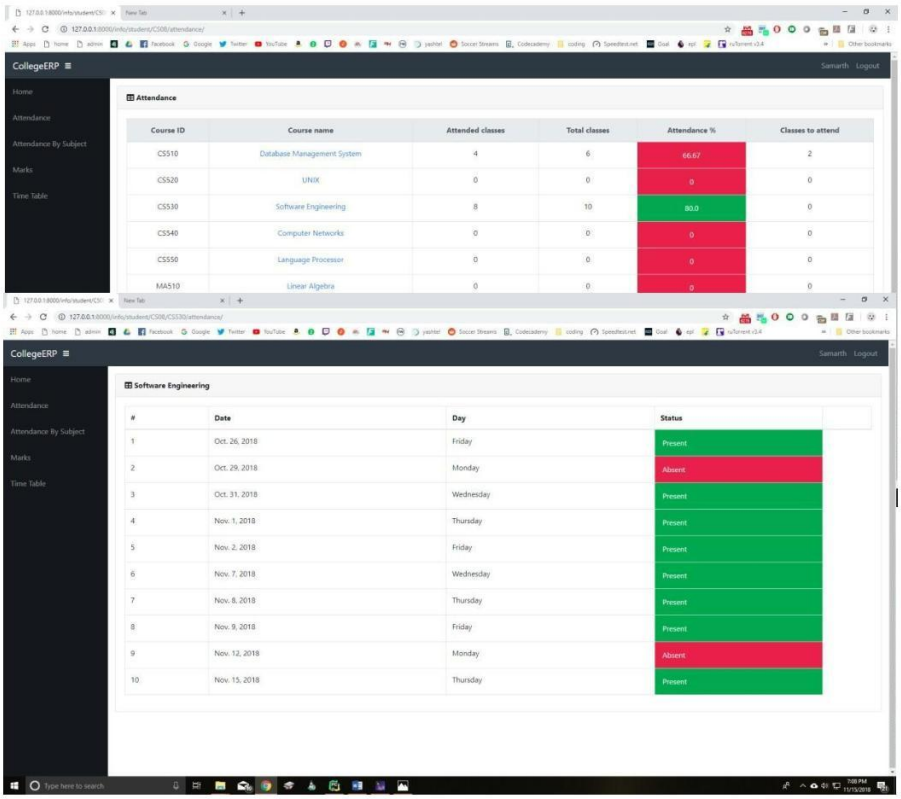


Figure 5: Student Attendance Page

Figure 6: Student Attendance Detail Page

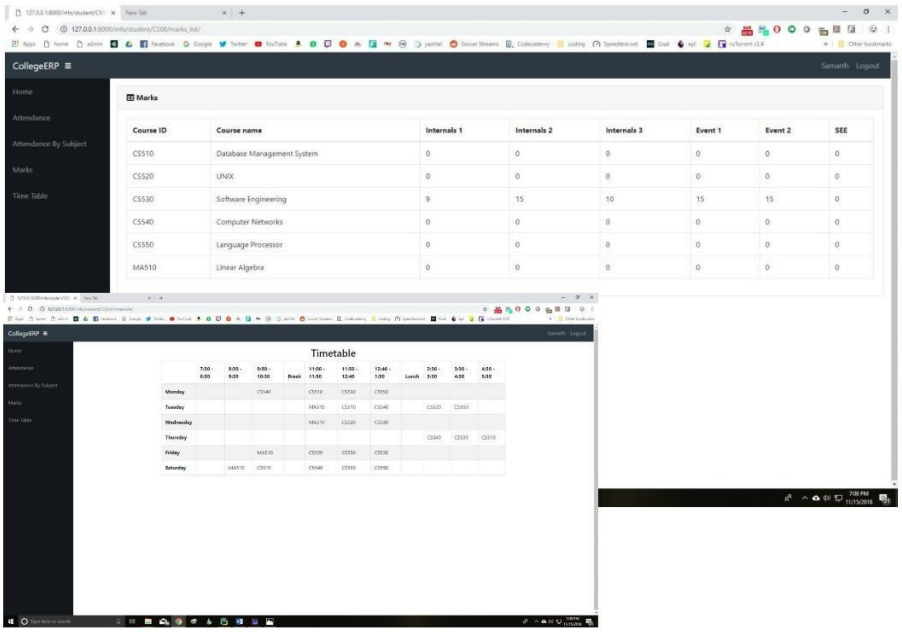


Figure 7: Student Marks Page

Figure 8: Student Timetable

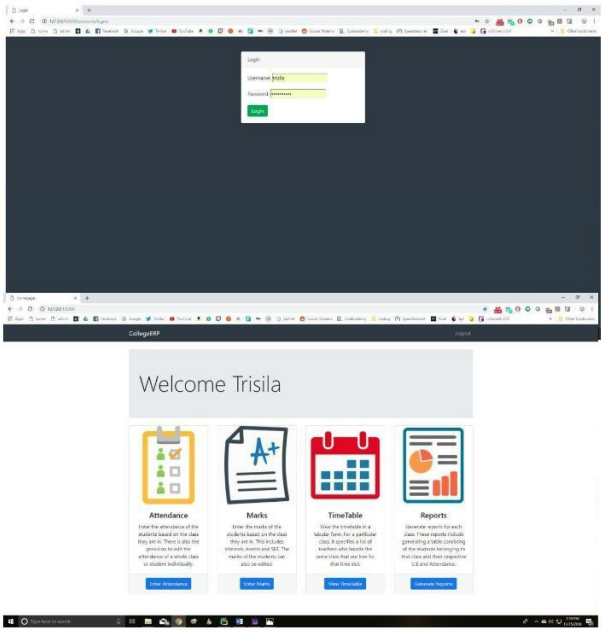


Figure 9: Teacher Login

Figure 10: Teacher homepage

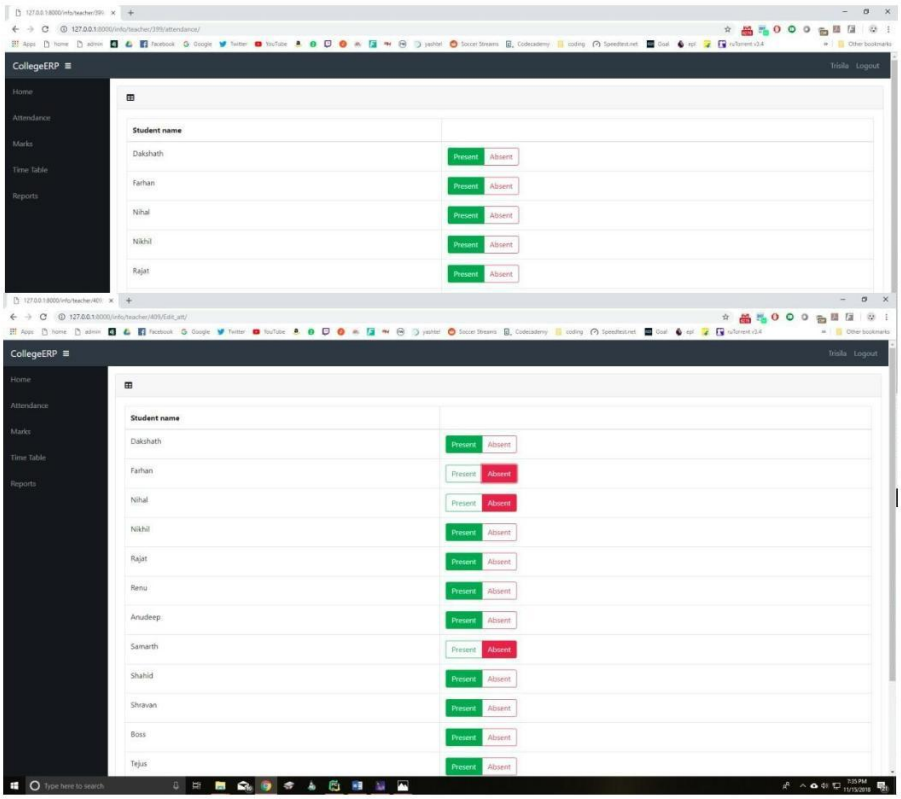


Figure 11: Entering attendance

Figure 12: Editing attendance

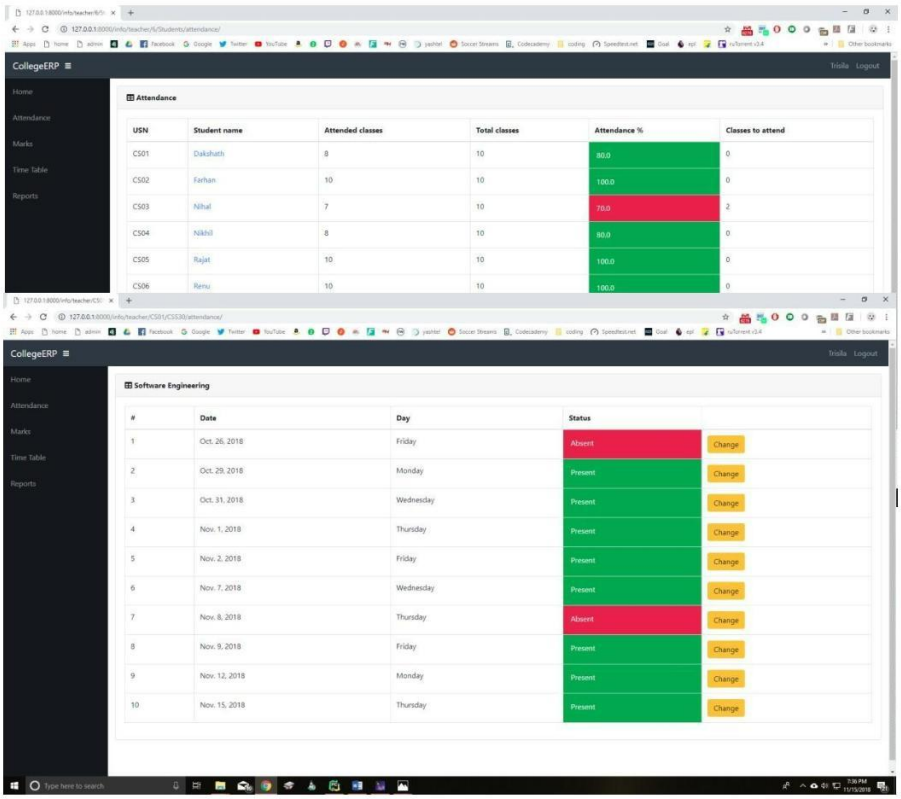


Figure 13: Attendance of students in a class

Figure 14: Attendance details of an individual student

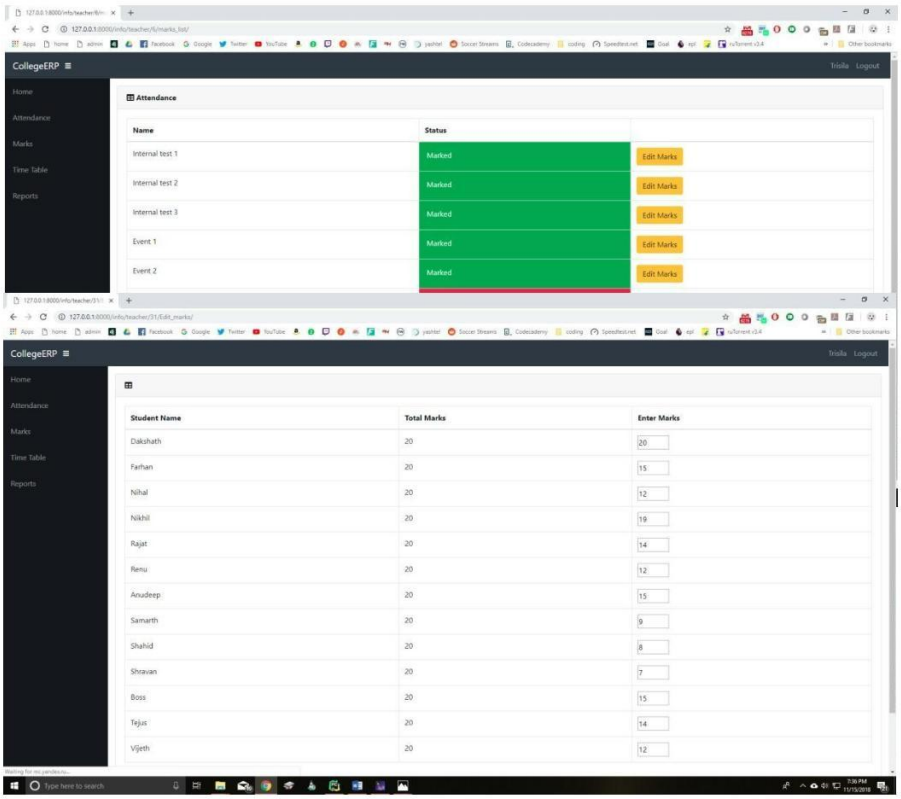


Figure 15: Entering marks

Figure 16: Editing marks

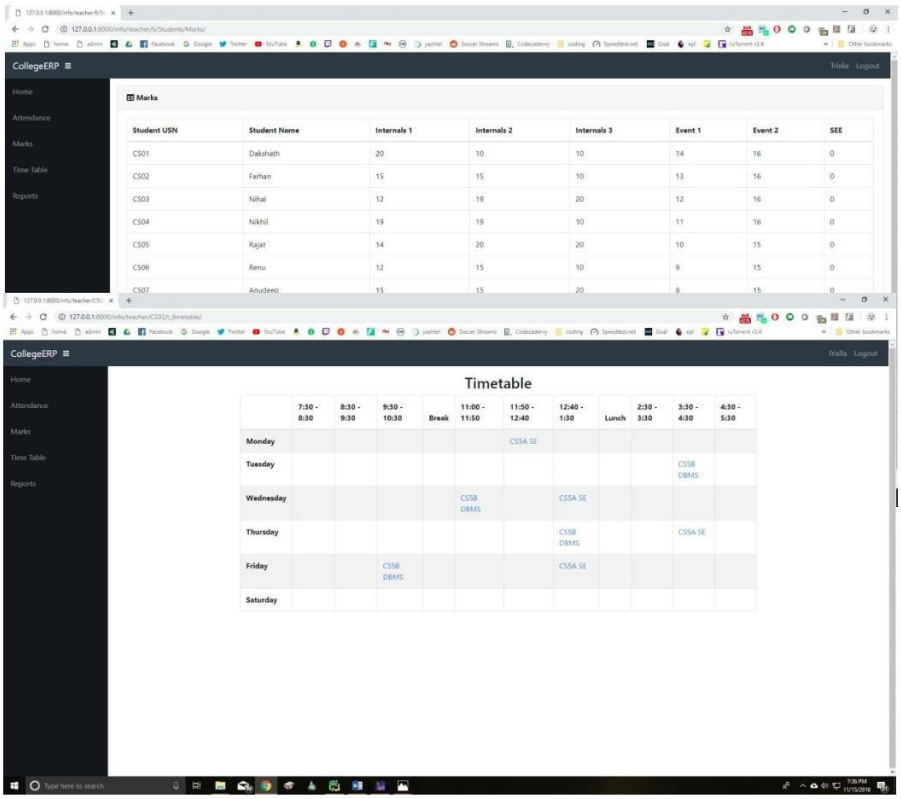


Figure 17: Marks of all the students in a class

Figure 18: Teacher Timetable

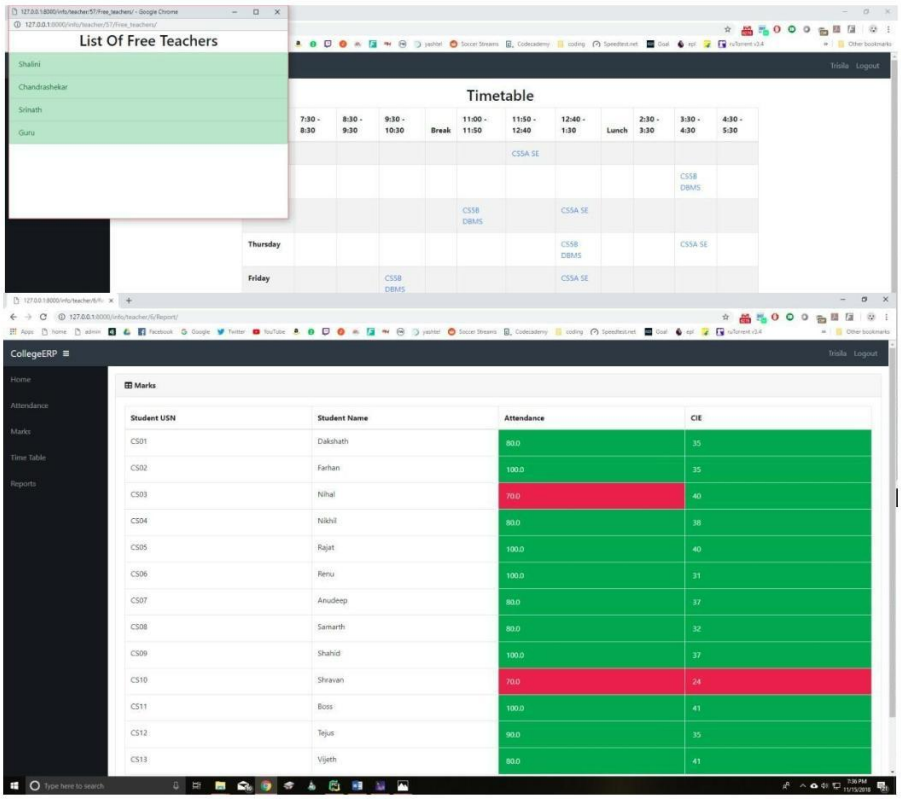
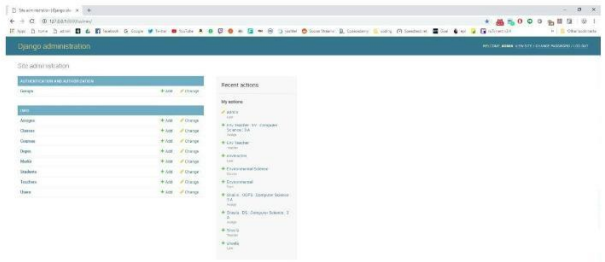


Figure 19: List of free teachers for a time slot

Figure 20: CIE and attendance for a class of students



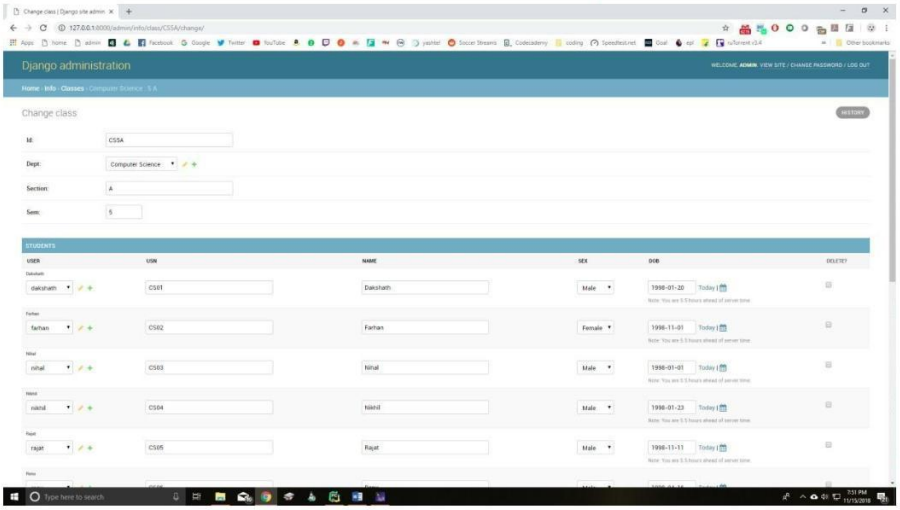


Figure 21: Admin homepage

Figure 22: Admin students table page

6 Conclusion and future work

By using Existing System accessing information from files is a difficult task and there is no quick and easy way to keep the records of students and staff. Lack of automation is also there in the Existing System. The aim of Our System is to reduce the workload and to save significant staff time.

Title of the project as University Management System is the system that deals with the issues related to a particular institution. It is the very useful to the student as well as the faculties to easy access to finding the details. The UMS provides appropriate in- formation to users based on their profiles and role in the system. This project is designed keeping in view the day to day problems faced by a college system.

The fundamental problem in maintaining and managing the work by the administra- tor is hence overcome. Prior to this it was a bit difficult for maintaining the time table and also keeping track of the daily schedule. But by developing this web-based applica- tion the administrator can enjoy the task, doing it ease and also by saving the valuable time. The amount of time consumption is reduced and also the manual calculations are omitted, the reports can be obtained regularly and also whenever on demand by the user. The effective utilization of the work, by proper sharing it and by providing the accurate results. The storage facility will ease the job of the operator. Thus the system developed will be helpful to the administrator by easing his/her task.

This System provide the automate admissions no manual processing is required. This is a paperless work. It can be monitored and controlled remotely. It reduces the man power required. It provides accurate information always.. All years together gathered information can be saved and can be accessed at any time. The data which is stored in the repository helps in taking intelligent decisions by the management providing the accurate results. The storage facility will ease the job of the operator. Thus the system developed will be helpful to the administrator by easing his/her task providing the accu- rate results. The storage facility will ease the job of the operator.

This project is successfully implemented with all the features and modules of the college management system as per requirements.

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