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A

## Project Report

on

# ENTERPRISE RESOURCE PLANNING

submitted for partial fulfilment for the award of

## BACHELOR OF TECHNOLOGY

### DEGREE

in

### Computer Science

By

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Lucknow  
May 2024**

## **DECLARATION**

I/We hereby declare that this submission is our own work and that, to the best of our knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

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## CERTIFICATE

This is to certify that Project Report entitled "**Enterprise Resource Planning**" which is submitted by **Avinash Kumar and Varun Kumar Tiwari** in partial fulfillment of the requirement for the award of degree B.Tech. in the Department of Computer Science of Dr. A.P.J. Abdul Kalam Technical University, Lucknow is a record of the candidates own work carried out by them under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree.

**Supervisor**

Ms. Neha Shukla  
Assistant Professor  
CS, Department

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## **ABSTRACT**

ERP HRMS is a Web Application that provides an integrated real-time view of core business processes, using common databases maintained by a database management system. Human Resources Management System (HRMS) as a discipline and in particular basic HR activities and processes within the information technology field, the programming of data processing systems evolved into standardised routines and packages of enterprise resource planning (ERP) software. To reduce the manual workload of these administrative activities, organizations began to electronically automate many of these processes by introducing specialized human resource management systems.

The proposed system includes automated document generation, real-time attendance tracking, and centralized data management, which greatly reduce administrative burden and improve communication among stakeholders. The system's integration with the KIET Pariksha mobile app allows students to access examination-related information conveniently, contributing to a better user experience.

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## **LIST OF ABBREVIATIONS**

| <b>Abbreviation</b> | <b>Description</b>        |
|---------------------|---------------------------|
| ERP                 | Enterprise Resource       |
| HRMS                | Human Resource            |
| HOD                 | Head Of The Department    |
| SDLC                | Software development life |
| COE                 | Controller Of Examination |

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Introduction To ERP COE**

- COE, or Controller of Examination, integrated into the "KIET Pariksha" app, modernizes academic administration by automating crucial tasks such as generating Datesheets, Seating Plans, and Invigilator Requirements. This automation not only saves significant time for administrators but also minimizes the likelihood of errors, ensuring the seamless organization and execution of examinations.
- COE promotes a culture of transparency and inclusivity within the academic institution. By centralizing examination processes and data within the KIET Pariksha app, stakeholders including faculty members, students, and administrators have easy access to vital information such as attendance records and invigilator assignments. This fosters collaboration, communication, and accountability, ultimately enriching the academic experience for all involved.
- With COE, students enjoy unparalleled convenience and accessibility to essential examination-related information. Real-time access to Datesheets, Seating Plans, and other pertinent details empowers students to plan their study schedules effectively, alleviating stress and enhancing their overall exam experience. Moreover, improved attendance tracking encourages a more proactive approach to class participation and engagement.

### **1.2 Project Category (Full Stack Web Development and Mobile Application)**

COE, or Controller of Examination, is a web development project aimed at

streamlining academic operations through the "KIET Pariksha" mobile app. It facilitates the generation of essential documents like Datesheets, Seating Plans, Invigilator Requirements, and Attendance Roasters. With seamless integration into the mobile app, COE simplifies administrative tasks, ensuring efficient management of examinations and class attendance. This innovative solution enhances accessibility, transparency, and organization, benefiting both administrators and students within the academic ecosystem.

### **1.3 Objectives**

The primary objective of the COE (Controller of Examination) project is to modernize and streamline the examination administration process within the academic institution. Its core goals include:

#### **1.3.1 Efficiency Enhancement**

By automating the generation of crucial documents such as Datesheets, Seating Plans, and Invigilator Roasters, COE aims to significantly reduce the administrative burden on examination coordinators and administrators. This efficiency enhancement translates into time savings and a reduction in manual errors, ultimately ensuring smoother examination logistics.

#### **1.3.2 Data Centralization and Reporting**

COE facilitates the centralization of examination-related data, enabling seamless communication and reporting between different stakeholders. It provides a mechanism for direct attendance reporting to the COE team, detention list management, and preventing detainees from marking attendance. Additionally, it generates comprehensive final attendance reports for Head of Departments (HODs), empowering them with accurate and up-to-date information to make informed decisions.

### **1.3.3 Transparency and Accountability**

By promoting transparency in examination processes, COE fosters trust and accountability within the academic ecosystem. Through features like real-time attendance tracking and detainee management, the project aims to ensure fairness and integrity in the assessment process. This transparency not only benefits administrators but also cultivates a culture of responsibility among students and faculty members.

### **1.3.4 Enhanced Student Experience**

Ultimately, the COE project seeks to enhance the overall student experience by providing timely access to essential examination-related information. Students benefit from features such as real-time access to Datesheets and Seating Plans, enabling better preparation and reducing anxiety during examinations. Moreover, improved attendance tracking mechanisms encourage student engagement and participation in classes, contributing to a more enriching academic environment.

## **1.4 Structure of Report**

This section provides an outline of the report's structure, highlighting the key components covered in each chapter. It offers a brief description of what is discussed in each section, reflecting on the essential points and topics you have addressed.

### **Chapter 2 Literature Review**

The literature review examines existing studies, theories, and best practices related to examination administration. It explores the limitations of traditional methods, such as manual processes, and the need for more efficient, automated solutions. This section identifies the

key challenges in managing exams and sets the stage for why the COE project is essential. It also references prior research that influenced the development of the proposed system.

### **Chapter 3 Proposed System**

This chapter outlines the proposed solution, detailing its architecture, components, and main functionalities. It describes how the proposed system addresses the issues highlighted in the literature review, such as automating the generation of datesheets and seating plans. The section emphasizes the expected benefits for different stakeholders, focusing on efficiency, transparency, and improved communication. Integration with existing platforms like the KIET Pariksha app is also discussed.

### **Chapter 4 Requirement Analysis and System Specification**

Requirement analysis covers the functional and non-functional requirements necessary to build the COE system. This section details what the system must accomplish, such as automated document generation and real-time attendance tracking. The system specification provides technical information, including the database structure, system architecture, user roles, and data relationships. It outlines how these elements work together to meet the project objectives.

### **Chapter 5 Implementation**

The implementation chapter describes the approach taken to build the COE system. It outlines the development process, from initial coding to integration with other systems. The tools and technologies used are discussed, along with any specific methodologies applied during development. This section also addresses any challenges faced during implementation and the solutions employed to overcome them.

## **Chapter 6 Testing and Maintenance**

This section focuses on the testing strategies employed to ensure the system's reliability and robustness. It discusses different types of testing, such as unit testing, integration testing, and user acceptance testing (UAT). The results of these tests are presented, highlighting the successful outcomes and any identified issues. The maintenance plan is also described, outlining how the system will be kept up-to-date, along with ongoing support and bug fixes. The approach to continuous improvement and gathering user feedback is mentioned.

## **Chapter 7 Results and Discussions**

The results and discussions chapter presents the outcomes achieved through the implementation of the COE project. It discusses how the system impacted examination administration, focusing on improvements in efficiency, data accuracy, and user experience. This section analyzes whether the project met its objectives and identifies key lessons learned during the process. Areas for further development or future enhancements are also suggested.

## **Chapter 8 Conclusion**

The conclusion summarizes the key points covered throughout the report, reinforcing the project's overall success. It reflects on the contributions made by the COE system and its positive impact on examination processes. This section also provides recommendations for future work or additional projects to build on the foundation established by the COE project.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Literature Review**

**Table 2.1 Literature Review**

| <b>Sr.<br/>No.</b> | <b>Authors</b>            | <b>Name of<br/>the paper</b>            | <b>Description</b>   |
|--------------------|---------------------------|---|--|
| 1                  | Prof. S. S. Aravinth      | Exam Hall Seating Arrangement System    | The paper most important goal for developing this software program is to computerize the traditional way of carrying out exams |
| 2                  | Prof . Gautami G. Shingan | Automated Supervision Allocation System | The paper introduces a gadget which used for college leave management  |

|          |                                  |   |   |
|----------|----------------------------------|---|---|
| <b>3</b> | Dinesh Chandewar,<br>Mainka Saha | Automatic<br>Seating<br>Arrangement<br>of University                          | The paper is<br>to lessenthe<br>significant<br>mission of<br>manually<br>allocating<br>seats at some<br>point of an<br>exam. The<br>device will<br>provide an<br>effective<br>measure to<br>dynamically<br>allocate<br>students in a<br>lecture room            |
| <b>4</b> | R.Gokila, Antony<br>Rohan Das    | Examination<br>Hall and<br>Seating<br>Arrangement<br>Application<br>using PHP | The paper<br>describes<br>system is<br>evolved to<br>generate the<br>examination<br>corridor<br>seating<br>arrangement<br>for students<br>efficaciously<br>. The<br>advanced<br>machine is<br>helpful for<br>each group<br>of workers<br>andcollege<br>students |

|          |                       |  |   |
|----------|-----------------------|--|---|
| <b>5</b> | R.Chandrasekr         | Automation of Hall Seating Arrangement System            | This paper show off venture which offers a solution to examination seating arrangement problems by means of executing the proposed chromatic polynomial set of rules. |
| <b>6</b> | Vamsi Krishna Yepur   | Examination Management Automation System                 | This paper provides a comparative look at on various techniques and device that exists and is being used broadly.   |
| <b>7</b> | Shazia Anjum, Madhuri | Automation of ExamHall Allotment and Seating Arrangement | This challenge allows in the technology of stories of seat preparations made and helps in producing random order of precise path or segment exams in every week.      |

## **2.2 Research Gaps**

The COE project addressed several research gaps in the domain of examination management:

### **2.2.1 Automation of Examination Processes:**

Existing systems lacked automation in generating examination-related documents, leading to inefficiencies and delays. The COE project introduced automation, reducing the administrative burden and ensuring consistent and error-free generation of datesheets and seating plans.

### **2.2.2 Centralized Data Management:**

Traditional approaches often dispersed examination-related data across multiple systems, creating inconsistencies and hindering effective communication. COE provided a centralized platform, enabling seamless data management and integration with other academic systems.

### **2.2.3 Transparency and Accountability:**

The lack of transparency in examination administration led to trust issues among stakeholders. The COE project addressed this by implementing robust attendance tracking, direct reporting to the COE team, and communication functionalities that improved stakeholder engagement and accountability.

## **2.3 Problem Formulation**

The system being developed is economic with respect to a general organization. It is cost-effective in the sense that it has eliminated the paperwork completely. The system is also time effective because the calculations are automated and are made at the end of the month or as per the user's requirement. The results obtained contain minimum errors and are

highly accurate as the data is required.

The system is economical as it does not use any other additional Hardware and software.

The system working is quite easy to use and learn due to its simple but attractive and informative interface. Users require no special training for operating the system

The UI of the project will be designed using AngularJS so the system is easily accessible to all users and is operationally feasible.

## **CHAPTER 3**

### **PROPOSED SYSTEM**

#### **3.1 Proposed System**

The proposed system for the COE (Controller of Examination) project represents a transformative step in modernizing examination administration within the academic institution. It introduces a comprehensive digital platform accessible through web browsers and mobile devices, ensuring seamless user experiences for administrators, faculty members, and students. At its core, the system automates critical processes such as generating Datesheets, Seating Plans, and Invigilator Roasters, thereby significantly reducing manual effort and potential errors.

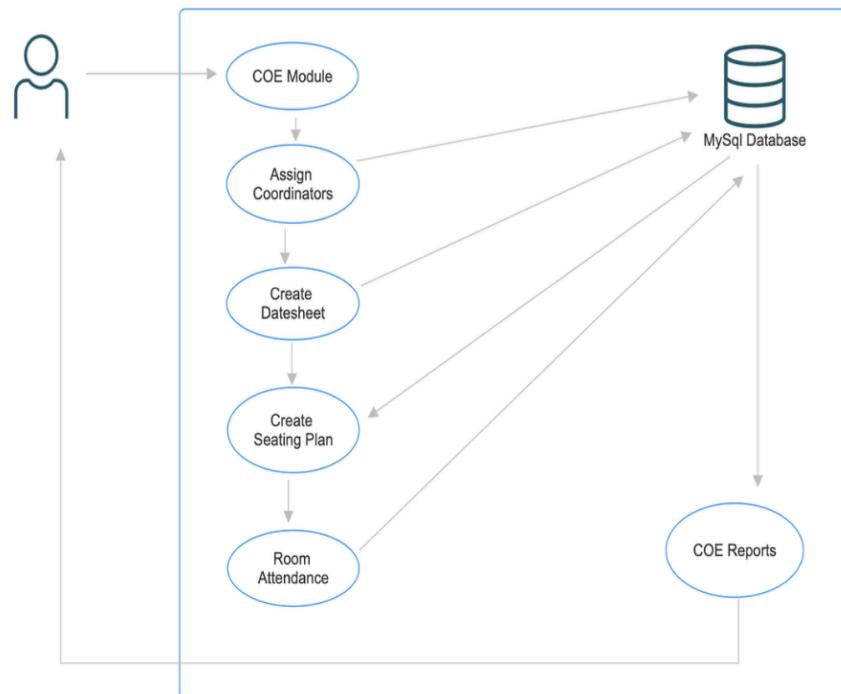
Moreover, robust attendance tracking mechanisms enable faculty members to record student attendance directly within the platform, with real-time data aggregation facilitating effortless generation of attendance reports. Additional features include detainee management and prevention of detainees from marking attendance, ensuring fairness and integrity in the assessment process. Communication and notification functionalities keep stakeholders informed about essential events such as examination dates and seating arrangements changes.

Centralization of examination-related data within the system ensures a single, reliable source of information, supported by stringent security measures to protect sensitive data. Seamless integration with the existing KIET Pariksha mobile app provides students with easy access to vital examination-related information. The system's customizable settings and scalability allow administrators to tailor it to the specific needs of different academic departments and examination schedules. Overall, the proposed COE system aims to enhance efficiency, transparency, and the overall

academic experience for all stakeholders involved in the examination process.

### 3.2 Unique Feature of the System

- An online system.
- A web-based application-It is a web-based application as it can be used by any agent connected across the organization. It is based on technologies like AngularJS and Django.
- A common universal process-It is based on a standard and common universal process for all kinds of organizations. Different user levels like COE Head, Datesheet Head, Seating Plan Head, etc. although have different roles, and follow a common procedure for using their respective features and roles.
- Keep track of information.



**Figure 3.1:Structure Diagram**

# **CHAPTER 4**

## **REQUIREMENT ANALYSIS AND SYSTEM SPECIFICATION**

### **4.1 Feasibility Study**

#### **4.1.1 Economically Feasibility:**

The system being developed is economic with respect to a general organization. It is cost-effective in the sense that it has eliminated the paperwork completely. The system is also time effective because the calculations are automated and are made at the end of the month or as per the user's requirement. The results obtained contain minimum errors and are highly accurate as the data is required.

#### **4.1.2 Technical Feasibility:**

The technical requirement for the system is economic and it does not use any other additional Hardware and software.

#### **4.1.3 Operational Feasibility:**

The UI of the project will be designed using AngularJS, so the system is easily accessible to all the users and is operationally feasible.

#### **4.1.4 Behavioural Feasibility:**

The system working is quite easy to use and learn due to its simple but attractive and informative interface. Users require no special training for operating the system.

### **4.2 Software Requirement Specification**

An ERP system integrates many functions across the business, such as financial management, human resources, sales, and manufacturing, to

deliver benefits such as increased productivity and efficiency. ERP implementation describes the process of planning, configuring, and deploying an ERP. The process typically continues for a few months—and it's complex because an ERP system supports and automates many different functions.

To ensure a successful implementation, the organization needs to carefully define its requirements, determine how to redesign processes to take advantage of the system, configure the ERP system to support those processes and rigorously test it before deploying it to users. Successfully navigating all those steps on schedule requires careful planning and a structured, phased implementation approach.

## ERP Implementation Stages

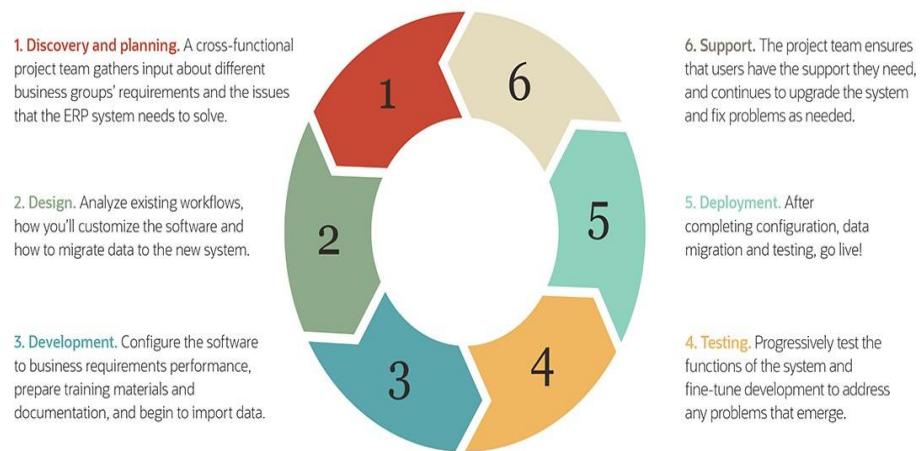


Figure 4.1: ERP Software development lifecycle

**The phases are :**

- I. Discovery and planning
- II. Design

- III. Development
- IV. Testing
- V. Deployment
- VI. Support

#### **4.2.1 Data Requirement**

**Student Information:** The system must maintain records of student information, including student ID, name, program, year of study, and contact details.

**Faculty Information:** The system should store data about faculty members, including faculty ID, name, department, and contact details.

**Course and Examination Details:** Data related to courses, examination schedules, and exam locations must be stored. This includes course codes, exam dates, times, rooms, and invigilators.

**Attendance Records:** The system should capture and store class attendance records, indicating which students were present or absent for each class session.

**Invigilator Roasters:** The system must store details of invigilators assigned to each exam, including their availability and assigned examination rooms.

**Seating Plans:** The system should maintain seating plans for each exam, indicating where students are to be seated.

**Detainee Lists:** The system must manage a list of students who are not allowed to attend classes or exams due to disciplinary reasons or other criteria.

#### **4.2.2 Functional Requirement**

**Generate Examination Documents:** The system should automatically generate examination-related documents, including Datesheets, Seating Plans, and Invigilator Roasters, based on predefined parameters and schedules.

**Record Attendance:** Faculty should be able to record student attendance for each class session, with the system preventing detainees from marking attendance.

**Communication and Notifications:** The system should send notifications and alerts to stakeholders about important events, such as exam dates, changes in seating plans, and detainee status.

**Data Integration:** The system should integrate with the KIET Pariksha mobile app, providing students with real-time access to examination information.

**Reporting and Analytics:** The system should generate various reports, such as final attendance reports for Heads of Departments (HODs) and detainee lists for the COE team.

#### **4.2.3 Performance Requirement**

**Response Time:** The system should respond to user requests within 2 seconds under normal load and within 5 seconds under peak load.

**Scalability:** The system must support concurrent access by multiple users without performance degradation, with scalability to handle future growth.

**Uptime and Availability:** The system should maintain a minimum uptime of 99.5%, with redundancy and backup mechanisms to ensure high availability.

#### **4.2.4 Maintainability Requirement**

**Modular Design:** The system should employ a modular design to facilitate easy updates and maintenance without affecting overall functionality.

**Documentation:** Comprehensive technical documentation should be provided to support maintenance, troubleshooting, and future development.

**User Training:** Training materials and user guides should be available to ensure users can effectively use and maintain the system.

**Continuous Improvement:** The system should be designed for continuous improvement, allowing for regular updates and feature enhancements based on user feedback.

#### **4.2.5 Security Requirement**

**Data Protection:** The system must employ encryption and secure storage to protect sensitive data, such as student and faculty information.

**Access Control:** Role-based access control (RBAC) should be implemented to restrict access to authorized users only.

**Audit Trails:** The system should maintain audit trails to track user activities and detect unauthorized access or suspicious behavior.

**Compliance:** The system must comply with relevant data protection regulations and standards, such as GDPR or FERPA, depending on the jurisdiction.

### **4.3 SDLC Model Used**

The Software Development Life Cycle (SDLC) is a methodology used to develop and manage software projects. While the SDLC is primarily focused on software development, it can be adapted and applied to various types of projects, including Enterprise Resource Planning (ERP) implementations. ERP systems are complex software solutions that integrate and manage various aspects of an organization's operations, such as finance, human resources, supply chain, and customer relationship management.

Here's how the SDLC can be applied to an ERP implementation:

- I. **Requirements Gathering:** The first phase involves understanding the organization's requirements for the ERP system. This includes identifying the specific modules and functionalities needed, as well as any customization or integration requirements.
- II. **System Design:** In this phase, the overall system architecture and design are planned. This includes defining the data model, user interface, workflows, and integrations with other systems.
- III. **Development:** The development phase involves building the ERP system according to the design specifications. This may include configuring the ERP software, customizing modules, developing additional functionalities, and integrating with existing systems.
- IV. **Testing:** Once the system is developed, thorough testing is performed to ensure that it meets the organization's requirements and functions correctly. This includes functional testing, integration testing, performance testing, and user acceptance testing.
- V. **Deployment:** After successful testing, the ERP system is deployed to the production environment. This involves migrating data from legacy systems, setting up infrastructure, and configuring security

and access controls.

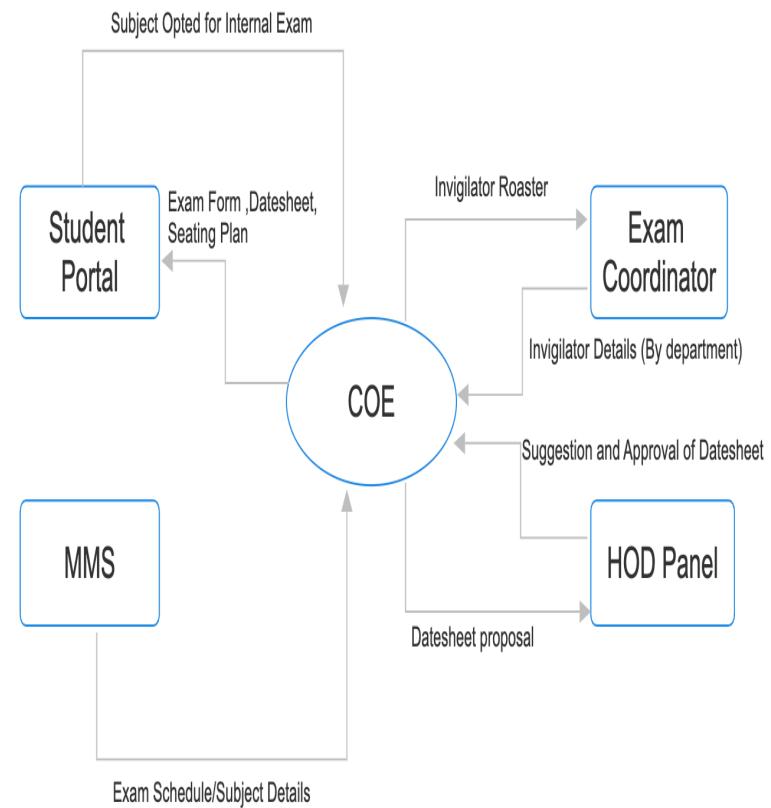
**VI. Training and User Acceptance:** Users and stakeholders are trained on how to use the ERP system effectively. User acceptance testing is conducted to ensure that the system meets the users' needs and expectations.

**VII. Maintenance and Support:** Once the ERP system is live, ongoing maintenance and support are required. This includes addressing issues, providing updates and enhancements, and ensuring system stability and security.

Throughout the SDLC, it is important to follow best practices such as documentation, change management, and project management methodologies to ensure the success of the ERP implementation. Additionally, organizations may choose to follow specific ERP implementation methodologies, such as the SAP Activate or Oracle Unified Method (OUM), which provide more detailed guidelines and frameworks for ERP projects.

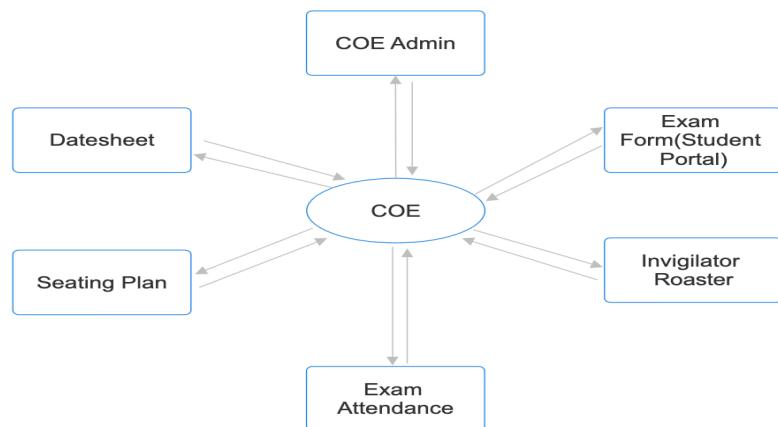
#### **4.4 System Design**

The data flow diagram makes communication between us and the user easier. DFDs help understand the flow of data and identify potential bottlenecks, data dependencies, or areas for improvement within a system. They provide a high-level overview of the system's functionality and data interactions. In a DFD, the system is represented as a collection of interconnected processes that receive input data, perform specific actions or transformations on the data, and produce output data. The data flows between these processes are represented by arrows, indicating the direction of data movement.



**Figure 4.2: Workflow diagram**

#### 4.4.1 Data Flow Diagrams



**Figure 4.3: DFD**

#### 4.4.2 Use Case Diagram

A use case diagram is the primary form of system software requirements for a new software program underdeveloped. Use cases specify the expected behavior (what), and not the exact method of making it happen (how). Use cases once specified can be denoted both textual and visual representation (i.e., use case diagram). A key concept of use case modeling is that it helps us design a system from the end user's perspective. It is an effective technique for communicating system behavior in the user's terms by specifying all externally visible system behavior.

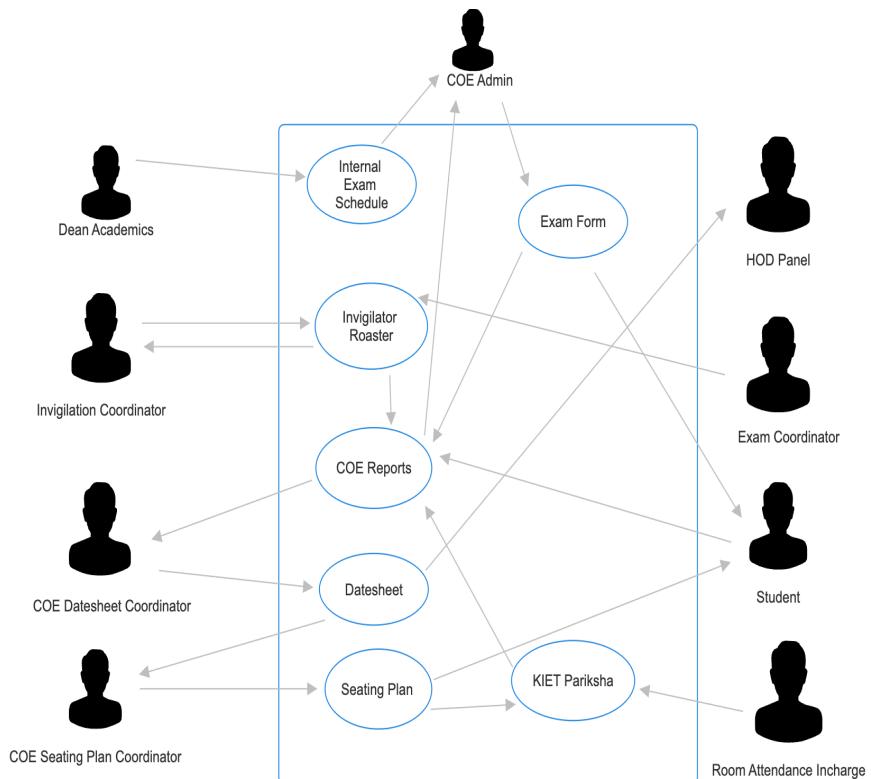
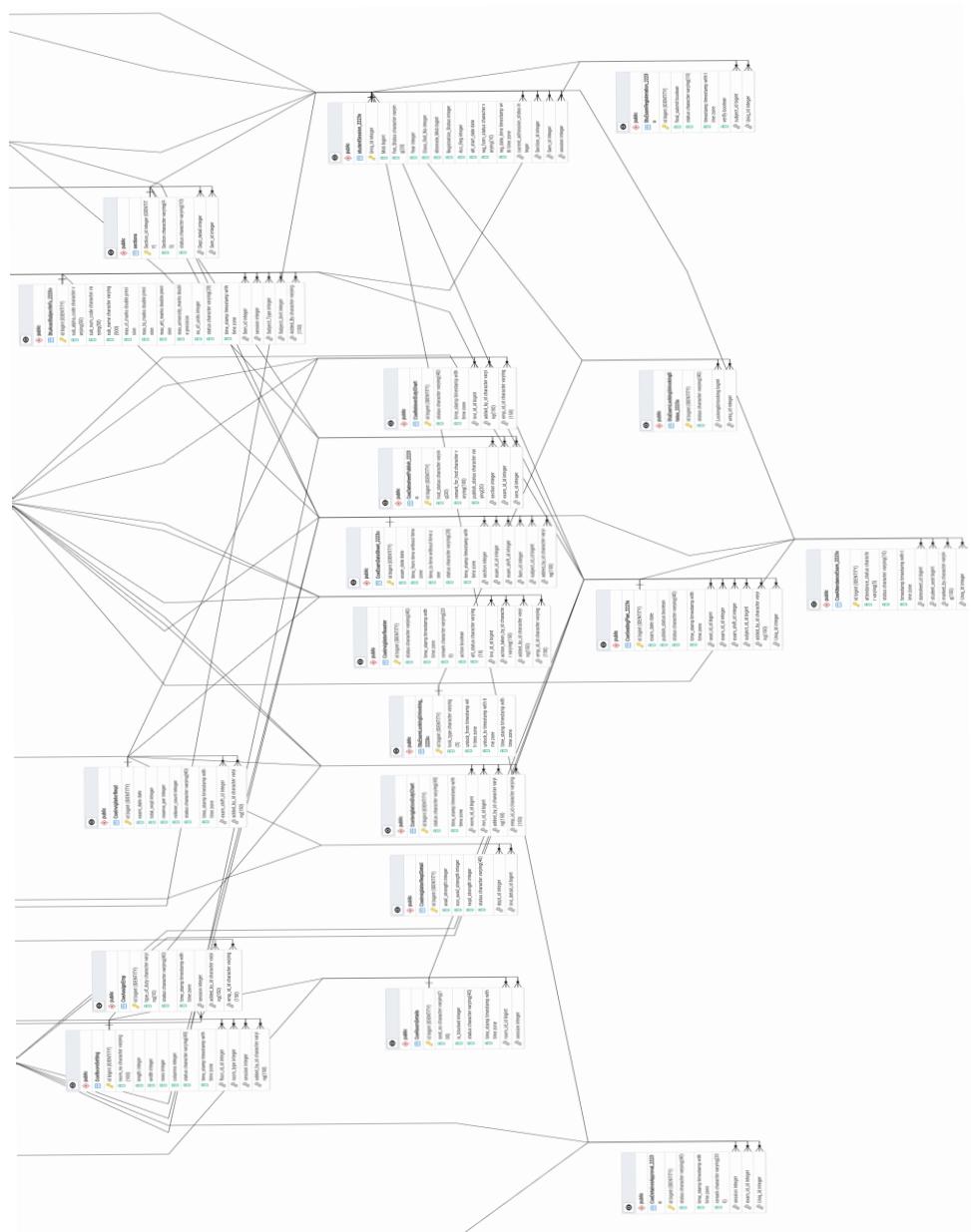


Figure 4.4: Use Case Diagram

## 4.5 Database Design



**Figure 4.5: Database Design**

## **CHAPTER 5**

### **IMPLEMENTATION**

#### **5.1 Introduction to Languages, Tools and Technologies Used for Implementation**

##### **5.1.1 Languages Used:**

###### **5.1.1.1 Python:**

1. Python is a high-level, interpreted programming language known for its simplicity and readability.
2. It has a clean and elegant syntax, making it easy to learn and write code quickly.
3. Python supports multiple programming paradigms, including object-oriented, procedural, and functional programming.
4. It has a vast standard library and a rich ecosystem of third-party packages, providing a wide range of functionalities.
5. Python is widely used in various domains, including web development, data analysis, artificial intelligence, scientific computing, and more.
6. It emphasizes code readability and follows the principle of "There should be one—and preferably only one—obvious way to do it" (Pythonic philosophy).

###### **5.1.1.2 JavaScript:**

1. JavaScript is a versatile scripting language primarily used for front-end web development.
2. It enables interactivity and dynamic behavior in web pages by manipulating the Document Object Model (DOM).
3. JavaScript can also be used on the server-side (with Node.js) to

build back-end applications. It supports event-driven programming and asynchronous operations, making it suitable for interactive web applications.

4. JavaScript has a wide range of frameworks and libraries such as React.js, AngularJS, and Vue.js, which simplify and enhance web development.
5. It is a core technology of the World Wide Web and plays a crucial role in modern web development.

#### **5.1.1.3 CSS (Cascading Style Sheets):**

1. CSS is a style sheet language used to describe the presentation and layout of a document written in HTML.
2. It separates the structure (HTML) from the design (CSS) of a web page, allowing developers to control the visual appearance.
3. CSS provides various selectors and properties to target and style specific elements on a web page.
4. It enables the creation of responsive designs, allowing websites to adapt to different screen sizes and devices.
5. CSS supports cascading and inheritance, making it easy to apply consistent styles across multiple pages.
6. CSS3 introduced advanced features like animations, transitions, and transformations, enhancing the visual experience of web pages.

#### **5.1.1.4 HTML (Hypertext Markup Language):**

1. HTML is the standard markup language used to create the structure and content of web pages.

2. It uses tags and elements to define the different components of a web page, such as headings, paragraphs, images, links, and forms.
3. HTML provides a semantic structure, allowing search engines and assistive technologies to understand the content better.
4. It forms the backbone of the World Wide Web and is supported by all web browsers.
5. HTML5 introduced new elements and APIs that enable multimedia playback, offline capabilities, and interactive features without the need for plugins.
6. HTML is often combined with CSS and JavaScript to create visually appealing and interactive web pages.

#### **5.1.1.5 SQL (Structured Query Language):**

1. SQL is a standard language for managing relational databases.
2. It is used to create, retrieve, update, and delete data from databases (e.g., MySQL, PostgreSQL, Oracle, SQL Server).
3. SQL allows developers to define the structure of databases using Data Definition Language (DDL) statements.
4. It provides powerful querying capabilities through Data Manipulation Language (DML) statements like SELECT, INSERT, UPDATE, and DELETE.
5. SQL supports various operations, including filtering, sorting, grouping, joining, and aggregating data.
6. It is widely used in web development, data analysis, and any application that involves working with structured data.
7. SQL is declarative, meaning you specify what you want, and the database engine figures out how to retrieve or modify the data.

### **5.1.2 Technologies Used:**

#### **5.1.2.1 AngularJS:**

1. AngularJS is a JavaScript-based open-source front-end web application framework developed by Google.
2. It follows the Model-View-Controller (MVC) architectural pattern, which helps in separating concerns and building scalable applications.
3. AngularJS provides a set of directives that extend HTML and enable the creation of dynamic views.
4. It supports two-way data binding, allowing automatic synchronization between the model and the view.
5. AngularJS provides dependency injection, making it easier to manage and test components.
6. It offers features like routing, form validation, and reusable components, which aid in rapid development.
7. AngularJS is suitable for building single-page applications (SPAs) and has a steep learning curve compared to other frameworks.

#### **5.1.2.2 React.js:**

1. React.js is a JavaScript library developed by Facebook for building user interfaces.
2. It follows the component-based architecture, where the UI is divided into reusable and independent components.
3. React.js uses a virtual DOM (Document Object Model) to efficiently update and render components.
4. It supports one-way data flow, making it easier to understand and debug the application.
5. React.js provides a declarative syntax using JSX (JavaScript

XML) to describe the structure and appearance of components.

6. It can be used for building both single-page applications (SPAs) and complex user interfaces.
7. React.js has a large and active community with extensive third-party libraries and tooling support.

#### **5.1.2.3 Django:**

1. Django is a high-level Python web framework that follows the Model-View-Template (MVT) architectural pattern.
2. It provides a robust set of tools and libraries for building web applications efficiently.
3. Django follows the "batteries included" philosophy, offering features like an ORM (Object-Relational Mapper), URL routing, authentication, and admin interface out of the box.
4. It emphasizes reusability and modularity using apps, which are self-contained components that can be plugged into different projects.
5. Django enforces good practices like secure coding, protection against common web vulnerabilities, and separation of concerns.
6. It has excellent documentation and an active community, making it easy to find resources and get help.
7. Django is well-suited for building database-driven web applications and has been used for various high-traffic websites.

#### **5.1.2.4 React Native:**

1. React Native is a JavaScript framework developed by Facebook for building native mobile applications.
2. It allows developers to write mobile apps using React.js syntax and

- components, which are then translated into native UI components.
- 3. React Native offers a single codebase that can be used for both iOS and Android platforms, reducing development time and effort.
  - 4. It provides access to native APIs and device features, enabling the creation of highly performant and feature-rich mobile apps.
  - 5. React Native supports hot reloading, allowing developers to see the changes instantly during the development process.
  - 6. It allows the integration of third-party libraries and existing native code, providing flexibility and extensibility.

### **5.1.3 Tool Used:**

#### **5.1.3.1 VS Code (Visual Studio Code):**

VS Code is a popular source code editor developed by Microsoft. It is lightweight, highly customizable, and supports a wide range of programming languages. It provides features such as syntax highlighting, intelligent code completion, debugging capabilities, version control integration, and a vast library of extensions that enhance its functionality. VS Code has gained popularity among developers due to its simplicity, performance, and extensive community support.

#### **5.1.3.2 Linux:**

Linux is an open-source operating system that serves as an alternative to proprietary operating systems such as Windows or macOS. It is built on the Unix kernel and is known for its stability, security, and flexibility. Linux distributions are available in various flavors, such as Ubuntu, Fedora, and CentOS, each with its own set of features and package management systems. Linux is widely used for web servers, development environments,

embedded systems, and as the foundation for many other software projects.

#### **5.1.3.3 PhpMyAdmin:**

PhpMyAdmin is a web-based graphical user interface (GUI) tool for managing and administering MySQL or MariaDB databases. It allows users to interact with databases through a web browser, providing functionalities such as creating and modifying databases, tables, and columns, executing SQL queries, importing and exporting data, and managing user permissions.

#### **5.1.3.4 GitHub:**

GitHub is a widely used web-based platform for version control and collaborative software development. It leverages Git, a distributed version control system, to enable multiple developers to work on projects simultaneously while tracking changes and maintaining code integrity. GitHub provides a repository hosting service where users can store and manage their code, collaborate on open-source projects, and contribute to various software communities. Features such as pull requests, issues tracking, and integrated continuous integration/continuous deployment (CI/CD) pipelines make GitHub an essential tool for modern software development, fostering collaboration, transparency, and efficiency in coding projects.

# **CHAPTER 6**

## **TESTING AND MAINTENANCE**

### **6.1 Testing Techniques and Test Cases Used**

#### **6.1.1 Testing Techniques:**

Testing techniques and test cases used in Enterprise Resource Planning (ERP) implementations can vary depending on the specific ERP system being used and the organization's requirements. However, here are some commonly used testing techniques and test cases in ERP projects:

##### **6.1.1.1 Functional Testing:**

1. Test the core functionalities of the ERP system, such as finance, inventory management, procurement, sales, and HR.
2. Validate that the system performs calculations accurately, processes transactions correctly, and generates expected outputs.
3. Verify that the system follows business rules and workflows defined by the organization.
4. Test different scenarios, such as creating, modifying, and deleting records, and ensure the system behaves as expected in each case.

##### **6.1.1.2 Integration Testing:**

1. Test the integration points between the ERP system and other external systems, such as CRM systems, supply chain management systems, or third-party applications.
2. Validate data exchange and synchronization between systems.
3. Verify that information flows correctly between different modules within the ERP system.

##### **6.1.1.3 Performance Testing:**

1. Test the ERP system's performance under different load

conditions, including normal usage, peak loads, and stress conditions.

2. Measure response times for key operations and transactions.
3. Verify the system's ability to handle a high volume of concurrent users and large data sets.

#### **6.1.1.4 Security Testing:**

1. Test the security features and controls of the ERP system to ensure data confidentiality, integrity, and availability.
2. Verify user access controls, authentication mechanisms, and authorization rules.
3. Conduct penetration testing to identify vulnerabilities and weaknesses in the system's security.

#### **6.1.1.5 User Acceptance Testing (UAT):**

1. Involve end users and stakeholders in testing the ERP system to ensure it meets their requirements and expectations.
2. Validate that the system's user interface is intuitive and easy to use.
3. Test typical user workflows and scenarios.
4. Gather feedback and address any usability issues or functional gaps identified during UAT.

#### **6.1.1.6 Regression Testing:**

1. Perform regression testing after system changes, upgrades, or patches to ensure that existing functionalities are not affected by the updates.
2. Re-test previously executed test cases to ensure they still pass after changes are made.

- Focus on critical and high-impact areas to ensure the system's stability and reliability.

#### **6.1.1.7 Data Migration Testing:**

- Test the accuracy and completeness of data migration from legacy systems to the ERP system.
- Validate that data is correctly transformed, mapped, and loaded into the ERP system.
- Perform data validation checks to ensure data integrity and consistency. It's important to note that ERP testing can be a complex and comprehensive process due to the interconnected nature of ERP systems and their impact on various business processes. It is recommended to involve experienced testers and domain experts to design and execute effective test strategies and test cases specific to the organization's ERP implementation.

## **6.2 Test Cases:**

### **6.2.1 Student Registration for Exam:**

**Table 6.1 Student Registration**

| Function               | Description   | Expected Output  | %TC Executed | %TC Passed | TC Pending | Priority | Remarks |
|------------------------|---|--|--------------|------------|------------|----------|---------|
| Duplicate Registration | Attempt to register a student who is already registered for the | System detects the duplicate registration and notifies the user. | 100          | 100        | 0          | High     | PASSED  |

|                          |  |  |     |     |   |      |        |
|--------------------------|--|--|-----|-----|---|------|--------|
| Registration Date passed | Check whether the student can still register after | Notifies the student that the exam form fill date is | 100 | 100 | 0 | High | PASSED |
|--------------------------|--|--|-----|-----|---|------|--------|

### 6.2.2 Date sheet Module:

Table 6.2 Date sheet Module

| Function           | Description  | Expected Output  | %TC Execut | %TC Passe | TC Pending | Priority | Remarks |
|--------------------|--|--|------------|-----------|------------|----------|---------|
| No Exams Scheduled | When no exams scheduled there is no exams showing on student and faculty | System provides a message indicating there are no exams to schedule. | 100        | 100       | 0          | High     | PASSED  |
| Empty Date Sheet   | Attempt to create a seating plan for an exam with an empty               | System prompts the user to schedule exams before creating a          | 100        | 100       | 0          | High     | PASSED  |

### 6.2.3 Seating Plan Creation:

**Table 6.3: Seating Plan Creation**

| Function                 | Description  | Expected Output   | %TC Execut | %TC Passe | TC Pending | Priority | Remarks |
|--------------------------|--|---|------------|-----------|------------|----------|---------|
| No Available Classrooms  | Creating a seating plan when there are no available                      | System notifies the user and prompts to add                       | 100        | 100       | 0          | High     | PASSED  |
| Invalid Seating Capacity | Assigning a seating plan with a capacity exceeding the maximum classroom | System rejects the assignment and asks for a valid configuration. | 100        | 100       | 0          | High     | PASSED  |

### 6.2.4 Invigilation Duty Chart:

**Table 6.4: Invigilation Duty Chart**

| Function                            | Description   | Expected Output  | %TC Execut | %TC Passe | TC Pending | Priority | Remarks |
|-------------------------------------|---|--|------------|-----------|------------|----------|---------|
| Generate Duty Chart for Single Exam | Request to generate the invigilation duty chart for a single exam | System generates a duty chart with assigned invigilators for each session of | 100        | 100       | 0          | High     | PASSED  |

|                                     |  |  |     |     |   |      |        |
|-------------------------------------|--|--|-----|-----|---|------|--------|
| Duty Chart for Multiple Exams       | Request to generate the invigilation duty chart for multiple exams without | System creates a comprehensive duty chart considering all exams without    | 100 | 100 | 0 | High | PASSED |
| No Invigilators Available           | Attempting to generate a duty chart when there are no                      | System prompts the user to assign invigilators before generating the duty  | 100 | 100 | 0 | High | PASSED |
| Overlapping Exam Sessions           | Scheduling exams with overlapping sessions                                 | System detects the overlap and prompts for resolution or adjustment        | 100 | 100 | 0 | High | PASSED |
| Uneven Distribution of Invigilation | Requesting a duty chart for exams where invigilation duties are unevenly   | System attempts to distribute duties as evenly as possible and notifies if | 100 | 100 | 0 | High | PASSED |

|   |  |   |     |     |   |      |        |
|---|--|---|-----|-----|---|------|--------|
| Unavailability of Invigilator               | Invigilator marked as unavailable for a                            | System accommodates the unavailability and assigns an alternative         | 100 | 100 | 0 | High | PASSED |
| Dynamic Changes in Invigilator Availability | Changes in invigilator availability after the duty chart is        | System allows dynamic updates to the duty chart to reflect the changes in | 100 | 100 | 0 | High | PASSED |
| Exceeding Maximum Hours for Invigilation    | Attempting to assign an invigilator duties exceeding their maximum | System prevents the assignment and notifies about the limit breach.       | 100 | 100 | 0 | High | PASSED |

**Table 6.5: Employee Details**

| NAME              | EMP ID | Designation    | Gender | D.O.J       |
|-------------------|--------|----------------|--------|-------------|
| Prof. Neha Shukla | 21005  | Ass. Professor | Female | 4-July-2019 |
| Dr. Gaurav Dubey  | 21324  | Professor      | Male   | 8-July-2022 |
| Ms. Akanksha      | 21131  | Ass. Professor | Female | 7-june-2021 |

|                      |       |                |        |              |
|----------------------|-------|----------------|--------|--------------|
| Mr. Abhishek Goyal   | 21330 | Ass. Professor | Male   | 18-july-2022 |
| Arti Sharma          | 21004 | Ass. Professor | Female | 3-july-2019  |
| Ms. Jyoti Srivastava | 3670  | Ass. Professor | Female | 10-june-2018 |

### 6.2.5 Taking Attendance through Mobile App:

**Table 6.5: Attendance through Mobile App**

| Function                        | Description  | Expected Output   | %TC Executed | %TC Passed | TC Pending | Priority | Remarks |
|---------------------------------|--|---|--------------|------------|------------|----------|---------|
| Offline Attendance Sync Failure | Attempting to sync offline attendance data with the main database when the data is corrupt | System detects corruption, logs the issue, and prompts for manual intervention. | 100          | 100        | 0          | High     | PASSED  |

|                            |   |   |     |     |   |      |        |
|----------------------------|---|---|-----|-----|---|------|--------|
| Check for detained student | Checking if the student is detained or not by comparison with detained criteria | System doesn't allow to mark the attendance of the detained student | 100 | 100 | 0 | High | PASSED |
|----------------------------|---|---|-----|-----|---|------|--------|

# **CHAPTER 7**

## **RESULTS AND DISCUSSIONS**

### **7.1 Description of Modules with Snapshots**

#### **7.1.1 MobiKIET**

- This mobile application tracks all the institutional activities of a student.
- It helps a student to check his marks, attendance, previous activities, mentor form, and many other things.
- It is a paperless solution to institutional tasks and reduces the manpower of employees.
- Any information which is essential to the student can be delivered immediately with the help of an in-built app notification feature.
- Provides receipts of all the payments made to the institution.
- **Scope:**
  - The students can use the application 24x7 from any place.
  - Reduces the work of calculation.
  - Cost effective.

#### **7.1.2 KIETKaksha**

- The objective of this application is to give faculties an easy-to-use platform which has selected important features of the HRMS portal and a few extra features which can come in handy in daily institutional work.
- Some of the available features are timetable, academic calendar, add/delete attendance, mentor form update, etc.

- Scope:
  - It is a live application and can be used 24x7 from any place
  - It can be used in the case of no internet availability.
  - Saves manpower.
  - Cost effective.

#### **7.1.3 Notification Module**

- In this module a CSV file of the dataset should be uploaded. From the dataset groups and subgroups can be made and saved for further use.
- Designed a Template that will render the content dynamically as entered by the user. The task Scheduling Frequency and message body can be defined dynamically.
- The access to the groups and subgroups is restricted to specific users. The authorized users can choose the groups or specific members and initiate the process and accordingly, the notification is sent
- Scope:
  - Save the environment by saving paper.
  - Save manpower.
  - Save Time
  - Cost effective.

#### **7.1.4 Appraisal Module**

- Conceptualized a complete online portal for the faculty & staff of the college for their annual appraisal
- where the Employee(s) have to fill their various achievements in

the particular academic year which was

- evaluated by the software, based on the evaluation the reports were sent to higher levels (like HOD, Dean, and Director) for the approval.
- Here the most interesting part was to design a user-friendly portal providing rich user experience.
- Scope:
  - On the basis of past work and achievements the data is automatically processed to give the points on different categories and accordingly appraisal is calculated.

#### **7.1.5 COE Module**

- Streamline and automate examination management processes within educational institutions.
- Reduce administrative burden and errors associated with manual examination tasks.
- Integrates with the KIET Pariksha mobile app for enhanced accessibility and user convenience.
- Consolidate all examination-related data into a single, accessible platform.

## Snapshots of ERP's COE

The screenshot shows the 'Create Datesheet' page. The left sidebar has sections for 'COE REPORTS ROLES' (Exam Registration Reports, DateSheet Reports, Seating Plan Reports, Invigilation Reports, Exam Attendance Report, Subject Count Report) and 'DY. COE INVIGILATION & DATESHEET ROLES' (Create Datesheet, Datesheet Status Report, Invigilation Requirement, Invigilation Roaster Report, Invigilation Dutyv Chart). The main form has fields for EXAM NAME\*, TIME FROM\*, COURSE\*, SEMESTER\*, SUBJECT TYPE, DATE, EXAM SHIFT\*, TIME TO\*, BRANCH\*, and SUBJECT\*. A note at the bottom says 'Note: Kindly Select Exam Name, Exam Shift, Course, Branch and Semester for Show Previous'. A 'Submit' button is at the bottom right.

Figure 7.1: Create Date sheet

The screenshot shows the 'Create SeatingPlan' page. The left sidebar has sections for 'Subject Count Report' and 'DY. COE INVIGILATION & DATESHEET ROLES' (Create Datesheet, Datesheet Status Report, Invigilation Requirement, Invigilation Roaster Report, Invigilation Dutyv Chart, Assign Reliever Duty, Reserve Faculty Report). The main form has fields for EXAM NAME\*, TIME FROM, DATE\*, FLOOR\*, ROOM NAME\*, EXAM SHIFT\*, TIME TO, BUILDING NAME\*, ROOM TYPE\*, COURSE\*, BRANCH\*, SEMESTER\*, SECTION\*, SIDE - A (with COURSE\*, BRANCH\*, SEMESTER\*, SECTION\*), and SIDE - B (with COURSE\*, BRANCH\*, SEMESTER\*, SECTION\*). A 'Generate Seating Plan' button is at the bottom right.

Figure 7.2: Create Seating Plan

### Detainee Approval

|  |   |           |                     |
|--|---|-----------|---------------------|
| EXAM NAME*   | CT  | COURSE*   | B.TECH ✗ B.PHARMA ✗ |
| BRANCH*  | IT ✗ CSE ✗ ECE ✗ CE ✗ EIE ✗ EN ✗<br>ME ✗ CSIT ✗ CS ✗ CSE(AI) ✗<br>CSE(AI&ML) ✗ KSOP ✗ | SEMESTER* | 6 ✗ 8 ✗             |
| SECTION*   | A ✗ B ✗ C ✗ D ✗ E ✗   |           |                     |
| <input type="button" value="Submit"/><br><a href="#">Show Previous</a> |   |           |                     |

**Figure 7.3: Detainee Approval**

| Generate Hall Ticket   |  |   |            |
|--|--|---|------------|
| EXAM NAME*   | CT ✗   | EXAM DATE*  | 02-04-2024 |
| COURSE *   | B.TECH ✗   | BRANCH *  | CS ✗       |
| SEMESTER *   | 8 ✗  |   |            |
| STUDENT(S) *   | VARUN KUMAR TIWARI ( 2000290120186 ) ✗ AVINASH KUMAR ( 2000290120050 ) ✗ |   |            |
| <a href="#">Print Hall Tickets</a>   |  |   |            |
|  <b>KIET</b><br><b>GROUP OF INSTITUTIONS</b><br><i>Connecting Life with Learning</i><br>(Toll Free no.: 1800 1200 106 Mobile: 8588811998, 9911150880) |  |   |            |
| Hall Ticket For : KOE-094(CT)<br><br>Student Name : AVINASH KUMAR<br>Exam Date : 2024-04-02<br>Roll No : 48<br>This Hall Ticket is valid for only 2024-04-02.<br><br>Controller Of Examination   |  | Building :E-BLOCK      Room No. :105<br><br>University Roll No. : 2000290120050<br>Department : CS<br>Semester - Section : 8-A<br><br> |            |
|  <b>KIET</b><br><b>GROUP OF INSTITUTIONS</b><br><i>Connecting Life with Learning</i><br>(Toll Free no.: 1800 1200 106 Mobile: 8588811998, 9911150880) |  |    |            |
| Hall Ticket For : KOE-094(CT)<br><br>Student Name : VARUN KUMAR TIWARI   |  | Building :E-BLOCK      Room No. :114<br><br>University Roll No. : 2000290120186<br><br>  |            |

**Figure 7.4: Generate Hall Ticket**

Invigilation Roaster Report

EXAM DATE\* 01-04-2024(Monday) EXAM SHIFT\* MORNING

**Submit**

Invigilation Roaster Report

[Export to Excel](#) [Print Table](#)

Total Rows : 12 Filtered Rows : 10

| Sno. | Department | Requirement | Employee Data   |
|------|------------|-------------|---|
| 1    | CE         | 2           | SHIKHA TYAGI (20754),KUNAL (20918)  |
| 2    | CS         | 4           | NEHA SHUKLA (21005),RAHUL KUMAR (21425),SHREELA PAREEK (21494),VIVEK KUMAR SHARMA (21509)                           |
| 3    | CSE        | 5           | MADHU GAUTAM (21036),PREETI GARG (21073),SAURAV CHANDRA (21113),KARNIKA DWIVEDI (21548),MANISH KUMAR MAURYA (21575) |
| 4    | CSE(AI&ML) | 2           | SAYANI GHOSAL (21485),ABHA KIRAN RAJPOOT (21492)  |
| 5    | CSE(AI)    | 2           | SAPNA JUNEJA (21202),ABHISHEK KUMAR (21499)   |

**Figure 7.5: Invigilation Roaster Report**

Invigilation Duty Chart

EXAM DATE\* 01-04-2024(Monday) EXAM SHIFT\* MORNING

**Submit**

Invigilation Duty Chart

[Export to Excel](#) [Print Table](#)

KIET GROUP OF INSTITUTIONS,GHAZIABAD

**Invigilation Duty Chart**

**Exam Date : 01-04-2024**

**Exam Shift : MORNING**

| Room No: | Employee                      | Department | Designation         | D.O.J      |
|----------|-------------------------------|------------|---------------------|------------|
| C-207    | MOHAMMAD SHARIZ ANSARI(11840) | EN         | ASSOCIATE PROFESSOR | 2010-07-29 |
|          | VIDHI BISHNOI(21565)          | ECE        | ASSISTANT PROFESSOR | 2023-12-18 |
| C-208    | RICHA GOEL(12073)             | KSOP       | ASSOCIATE PROFESSOR | 2011-07-31 |
|          | RAHUL KUMAR(21425)            | CS         | ASSISTANT PROFESSOR | 2022-12-12 |

**Figure 7.6: Invigilation Duty Chart**

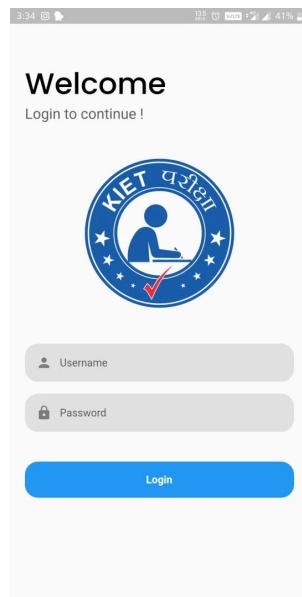


Figure 7.7: Login screen for attendance room incharge

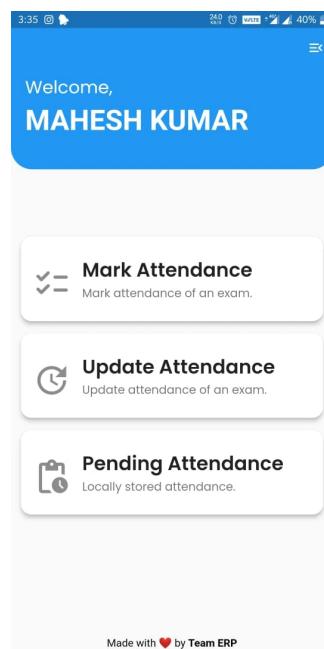
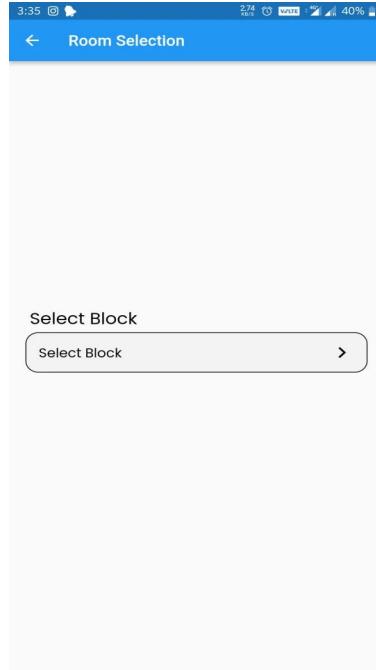
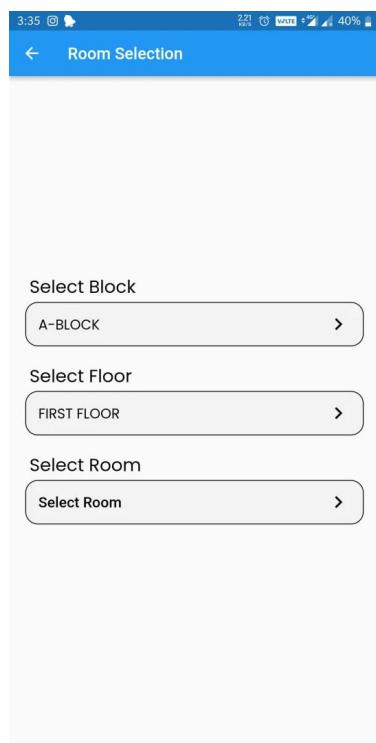


Figure 7.8: Dashboard screen for attendance room incharge



**Figure 7.9: Block selection screen for attendance room incharge**



**Figure 7.10: Room selection screen for attendance room incharge**

## **7.2 Key Findings of the Project**

### **7.2.1 Increased Efficiency through Automation:**

The COE (Controller of Examination) project achieved significant efficiency gains by automating critical examination processes. Tasks such as generating Datesheets, Seating Plans, and Invigilator Roasters, which were previously manual and time-consuming, became automated. This not only saved time but also reduced errors associated with manual handling.

### **7.2.2 Improved Data Centralization and Accessibility:**

The project successfully centralized examination-related data, creating a single source of truth for all stakeholders. This centralization made it easier for administrators to manage information and for students and faculty to access necessary data. The integration with the KIET Pariksha mobile app further enhanced accessibility, allowing users to view examination information on the go.

### **7.2.3 Enhanced Transparency and Accountability:**

With real-time attendance tracking and communication features, the COE project improved transparency in the examination process. Stakeholders received timely notifications about key events, such as exam schedules and seating arrangements. The ability to directly report attendance to the COE team and generate final attendance reports for department heads fostered a sense of accountability among faculty and students.

### **7.2.4 Stronger Security and Compliance:**

Security was a key focus of the COE project. The implementation of

robust encryption, role-based access control, and audit trails ensured that sensitive data was protected and that the system complied with relevant data protection regulations. This attention to security built trust among stakeholders and ensured the integrity of examination processes.

#### **7.2.5 Reduced Administrative Burden and Errors:**

By automating processes and centralizing data, the project reduced the administrative burden on examination coordinators and faculty. This reduction in manual tasks also led to a significant decrease in errors related to examination scheduling, seating arrangements, and attendance tracking.

#### **7.2.6 Scalability and Flexibility for Future Growth:**

The COE project demonstrated scalability and flexibility, allowing the system to accommodate future growth and changing examination requirements. The modular design facilitated easy updates and feature enhancements, ensuring the system could evolve with the institution's needs.

#### **7.2.7 Positive Impact on Student Experience:**

The project had a notable positive impact on the student experience. With improved accessibility to examination information and streamlined processes, students could better plan their studies and prepare for exams. The reduction in administrative delays and errors contributed to a smoother examination process, reducing stress for students.

## **7.3 Brief description of Database with Snapshots**

The database for the COE (Controller of Examination) project is designed to support the comprehensive management of examination-related processes. It centralizes critical data and provides a structured framework for storing, retrieving, and managing information. The following sections describe the key components, schema, and data relationships within the COE database.

### **7.3.1 Database Structure**

The COE database is structured to support efficient data retrieval and storage while maintaining data integrity and security. It employs a relational database management system (RDBMS) that allows for organized data storage through tables and relationships. The primary tables and their purposes are outlined below:

### **7.3.2 Tables and Relationships**

#### **Students Table:**

This table stores information about students enrolled in the academic institution. Key fields include student ID, name, program, year of study, and contact details. The student ID serves as the primary key and uniquely identifies each student.

#### **Faculty Table:**

This table contains data about faculty members, including faculty ID, name, department, and contact information. The faculty ID acts as the primary key.

#### **Courses Table:**

The courses table records details about academic courses, including course code, course name, department, and instructor.

It establishes relationships with the faculty and students tables, enabling tracking of which faculty teaches which course and which students are enrolled in each course.

**Examinations Table:**

This table holds information about examinations, such as exam ID, course code, exam date, time, duration, and location. It also includes a reference to the invigilator assigned to the exam.

**Seating Plans Table:**

The seating plans table stores information about seating arrangements for each exam. Key fields include exam ID, student ID, and seat number. This table establishes a relationship with the examinations and students tables to map students to their assigned seats.

**Invigilators Table:**

This table contains data about invigilators, including invigilator ID, name, and contact details. It maintains relationships with the examinations table to link invigilators to specific exams.

**Attendance Table:**

The attendance table records student attendance for classes and exams. It includes fields for student ID, course code, date, and attendance status (present/absent). This table helps track student attendance trends and enables automatic reporting.

**Detainee Table:**

The detainee table contains a list of students who are not allowed to attend classes or exams due to disciplinary reasons. It has fields for student ID and reason for detainment. This table is referenced by other tables to ensure detainees cannot mark attendance.

### **7.3.3 Data Integrity and Security**

To maintain data integrity, the COE database employs foreign key constraints to ensure proper relationships between tables. Unique constraints and primary keys prevent duplicate data entries. Security measures include user authentication and authorization, role-based access control, and data encryption to protect sensitive information.

### **7.3.4 Data Access and Performance**

The database is optimized for high performance, supporting efficient data retrieval and reporting. Indexes are used on commonly queried fields to improve query speed. The system is designed to handle concurrent access by multiple users without performance degradation.

### **7.3.5 Backup and Recovery**

Regular backups are conducted to ensure data recovery in case of system failures or data corruption. The database incorporates disaster recovery plans to ensure business continuity and minimal downtime.

Overall, the COE database is designed to provide a robust, secure, and efficient data management system for examination-related processes, supporting the needs of administrators, faculty, and students.

### 7.3.6 Database Snapshots

Showing rows 0 - 24 (33 total, Query took 0.0018 seconds.)

SELECT \* FROM `StuAcadDropdown` WHERE `Value` LIKE '%B\_TECH%'

| Sno  | Pid  | Field     | Value                                | Is_Edit | Is_Delete | status | session |
|------|------|-----------|--------------------------------------|---------|-----------|--------|---------|
| 2447 | 2367 | EXAM NAME | PRE CT - B.TECH/B.PHARM (I, II, III) | 1       | 0         | UPDATE | 14      |
| 2449 | 2367 | EXAM NAME | CT 1 - B.TECH/B.PHARM (I, II)        | 1       | 0         | UPDATE | 14      |
| 2450 | 2367 | EXAM NAME | CT 2 - B.TECH/B.PHARM (I, II)        | 1       | 0         | UPDATE | 14      |
| 2503 | 2367 | EXAM NAME | CT B.TECH/B.PHARM (III)              | 1       | 0         | INSERT | 14      |
| 2504 | 2367 | EXAM NAME | CT B.TECH/B.PHARM (IV)               | 1       | 0         | INSERT | 14      |
| 2510 | 2367 | EXAM NAME | MAKEUP CT 1 - B.TECH/B.PHARM (I, II) | 1       | 0         | INSERT | 14      |
| 2511 | 2367 | EXAM NAME | MAKEUP CT 2 - B.TECH/B.PHARM (I, II) | 1       | 0         | INSERT | 14      |
| 2514 | 2367 | EXAM NAME | MAKEUP CT B.TECH/B.PHARM (III)       | 1       | 0         | UPDATE | 14      |
| 2515 | 2367 | EXAM NAME | MAKEUP CT B.TECH/B.PHARM (IV)        | 1       | 0         | UPDATE | 14      |
| 2737 | 2622 | EXAM NAME | PRE CT - B.TECH/B.PHARM (I, II, III) | 1       | 0         | UPDATE | 15      |
| 2739 | 2622 | EXAM NAME | CT 1 - B.TECH/B.PHARM (I, II)        | 1       | 0         | UPDATE | 15      |
| 2740 | 2622 | EXAM NAME | CT 2 - B.TECH/B.PHARM (I, II)        | 1       | 0         | UPDATE | 15      |
| 2743 | 2622 | EXAM NAME | CT B.TECH/B.PHARM (III)              | 1       | 0         | INSERT | 16      |

Figure 7.11: Dropdown table for exam names and courses

Showing rows 0 - 24 (131080 total, Query took 0.0004 seconds.)

SELECT \* FROM `StuAcadAttendance\_2324o`

| id | date       | lecture | normal_remedial | isgroup | status | time_stamp                 | app           | constraint_key     | emp_id_id | group_id_id | section_id | subject_id_id |
|----|------------|---------|-----------------|---------|--------|----------------------------|---------------|--------------------|-----------|-------------|------------|---------------|
| 1  | 2023-08-16 | 3       | N               | N       | DELETE | 2023-08-17 10:31:49        | 1692264016389 | 5187               | 20920     | NULL        | 163        | 745           |
| 2  | 2023-08-17 | 4       | N               | N       | DELETE | 2023-08-17 11:33:36.412782 | 0             | 1692771288.2304769 | 20920     | NULL        | 96         | 720           |
| 3  | 2023-08-16 | 3       | N               | N       | DELETE | 2023-08-17 12:13:36.412782 | 0             | 1692771288.2304769 | 20920     | NULL        | 163        | 745           |
| 4  | 2023-08-16 | 5       | N               | N       | DELETE | 2023-08-17 12:16:47.430278 | 0             | 1692272846.6404076 | 9376      | NULL        | 97         | 729           |
| 5  | 2023-08-16 | 6       | N               | N       | DELETE | 2023-08-17 12:16:48.621978 | 0             | 1692272866.9712796 | 9376      | NULL        | 97         | 729           |
| 6  | 2023-08-16 | 1       | N               | N       | DELETE | 2023-08-17 12:29:11.532303 | 0             | 1692230918.8366843 | 20920     | NULL        | 164        | 196           |
| 7  | 2023-08-16 | 7       | N               | N       | DELETE | 2023-08-17 12:29:53.454440 | 0             | 1692281211.0464294 | 20920     | NULL        | 164        | 196           |
| 8  | 2023-08-17 | 1       | N               | N       | DELETE | 2023-08-17 12:30:39.937642 | 0             | 1692291434.253195  | 20920     | NULL        | 164        | 196           |
| 9  | 2023-08-17 | 3       | N               | Y       | DELETE | 2023-08-17 12:40:35.928740 | 0             | 1692294229.9126413 | 20920     | 134         | 164        | 196           |
| 10 | 2023-08-17 | 1       | N               | Y       | INSERT | 2023-08-17 12:46:30.312942 | 0             | 0                  | 20903     | 152         | 119        | 452           |
| 11 | 2023-08-17 | 2       | N               | Y       | INSERT | 2023-08-17 12:46:30.473487 | 0             | 0                  | 20903     | 152         | 119        | 452           |
| 12 | 2023-08-17 | 1       | N               | Y       | INSERT | 2023-08-17 12:47:13.923114 | 0             | 0                  | 20903     | 153         | 119        | 452           |
| 13 | 2023-08-17 | 2       | N               | Y       | INSERT | 2023-08-17 12:47:14.088941 | 0             | 0                  | 20903     | 153         | 119        | 452           |
| 14 | 2023-08-17 | 3       | N               | Y       | DELETE | 2023-08-17 13:41:26.136935 | 0             | 1692267828.9732144 | 20982     | 145         | 118        | 112           |

Figure 7.12: Table for detainee and attendance

Showing rows 0 - 24 (721 total, Query took 0.0001 seconds.)

SELECT \* FROM `CoeExamDateSheet\_23240`

Number of rows: 25 Filter rows: Search this table

Sort by key: None

+ Options

|    | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | id | exam_date  | time_from       | time_to         | status | time_stamp                 | added_by_id | exam_id_id | exam_shift_id | section | Sem_id | subject_id_id |
|----|-------------------------------|-------------------------------|---------------------------------|----|------------|-----------------|-----------------|--------|----------------------------|-------------|------------|---------------|---------|--------|---------------|
| 1  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 1  | 2023-10-09 | 10:00:00.000000 | 10:15:00.000000 | 1      | 2023-09-29 15:16:46.503405 | 21476       | 3078       | 2862          | NULL    | 251    | 19            |
| 2  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 2  | 2023-10-10 | 10:00:00.000000 | 10:15:00.000000 | 1      | 2023-09-29 15:17:16.715444 | 21476       | 3078       | 2862          | NULL    | 251    | 20            |
| 3  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 3  | 2023-10-11 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:17:26.627369 | 21476       | 3078       | 2862          | NULL    | 251    | 21            |
| 4  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 4  | 2023-10-12 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:17:36.014037 | 21476       | 3078       | 2862          | NULL    | 251    | 22            |
| 5  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 5  | 2023-10-13 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:17:55.695668 | 21476       | 3078       | 2862          | NULL    | 251    | 318           |
| 6  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 6  | 2023-10-09 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:19:56.297529 | 21476       | 3078       | 2862          | NULL    | 253    | 187           |
| 7  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 7  | 2023-10-10 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:20:20.160115 | 21476       | 3078       | 2862          | NULL    | 253    | 188           |
| 8  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 8  | 2023-10-11 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:20:33.021401 | 21476       | 3078       | 2862          | NULL    | 253    | 189           |
| 9  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 9  | 2023-10-12 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:21:01.666685 | 21476       | 3078       | 2862          | NULL    | 253    | 190           |
| 10 | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 10 | 2023-10-13 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:21:11.317248 | 21476       | 3078       | 2862          | NULL    | 253    | 191           |
| 11 | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 11 | 2023-10-09 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:22:05.250201 | 21476       | 3078       | 2862          | NULL    | 255    | 195           |
| 12 | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 12 | 2023-10-11 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:22:24.880042 | 21476       | 3078       | 2862          | NULL    | 255    | 196           |
| 13 | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 13 | 2023-10-12 | 10:00:00.000000 | 12:00:00.000000 | 1      | 2023-09-29 15:22:32.765231 | 21476       | 3078       | 2862          | NULL    | 255    | 197           |

Figure 7.13: Table for date sheet

Showing rows 0 - 24 (184952 total, Query took 0.0004 seconds.)

SELECT \* FROM `CoeSeatingPlan\_2223e`

Number of rows: 25 Filter rows: Search this table

Sort by key: None

+ Options

|    | <input type="checkbox"/> Edit | <input type="checkbox"/> Copy | <input type="checkbox"/> Delete | id | exam_date  | status | time_stamp                 | publish_status | added_by_id | exam_id_id | exam_shift_id | seat_id_id | subject_id_id | Uniq_Id |
|----|-------------------------------|-------------------------------|---------------------------------|----|------------|--------|----------------------------|----------------|-------------|------------|---------------|------------|---------------|---------|
| 1  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 1  | 2023-03-20 | DELETE | 2023-03-15 17:20:33.959884 | 1              | 11835       | 2744       | 2606          | 18012      | 580           | 7413    |
| 2  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 2  | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960011 | 1              | 11835       | 2744       | 2606          | 18020      | 580           | 6809    |
| 3  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 3  | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960100 | 1              | 11835       | 2744       | 2606          | 18028      | 580           | 6981    |
| 4  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 4  | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960184 | 1              | 11835       | 2744       | 2606          | 18036      | 580           | 6136    |
| 5  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 5  | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960267 | 1              | 11835       | 2744       | 2606          | 18044      | 580           | 7448    |
| 6  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 6  | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960350 | 1              | 11835       | 2744       | 2606          | 18052      | 580           | 6708    |
| 7  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 7  | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960434 | 1              | 11835       | 2744       | 2606          | 18060      | 580           | 6706    |
| 8  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 8  | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960515 | 1              | 11835       | 2744       | 2606          | 18014      | 580           | 6923    |
| 9  | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 9  | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960600 | 1              | 11835       | 2744       | 2606          | 18022      | 580           | 7743    |
| 10 | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 10 | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960681 | 1              | 11835       | 2744       | 2606          | 18030      | 580           | 7570    |
| 11 | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 11 | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960764 | 1              | 11835       | 2744       | 2606          | 18038      | 580           | 6956    |
| 12 | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 12 | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960846 | 1              | 11835       | 2744       | 2606          | 18046      | 580           | 7496    |
| 13 | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 13 | 2023-03-20 | DELETE | 2023-03-15 17:20:33.960929 | 1              | 11835       | 2744       | 2606          | 18054      | 580           | 7011    |
| 14 | <input type="checkbox"/>      | <input type="checkbox"/>      | <input type="checkbox"/>        | 14 | 2023-03-20 | DELETE | 2023-03-15 17:20:33.961011 | 1              | 11835       | 2744       | 2606          | 18062      | 580           | 7446    |

Figure 7.14: Table for Seating Plan

→ Server: localhost » Database: latest\_erp » Table: CoeInvigilationDutyChart

[Browse](#) [Structure](#) [SQL](#) [Search](#) [Insert](#) [Export](#) [Import](#) [Privileges](#) [0](#)

Showing rows 0 - 24 (6662 total, Query took 0.0004 seconds.)

```
SELECT * FROM `CoeInvigilationDutyChart`
```

1 > >> | Number of rows: 25 | Filter rows: Search this table

Sort by key: None

+ Options

| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 3  | INSERT | 2023-02-03 15:26:07.124839 | 4502 | 20752 | 8 | 160 |
|-------------------------------------|-------------------------|----------------------|------------------------|----|--------|----------------------------|------|-------|---|-----|
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 4  | INSERT | 2023-02-03 15:26:07.124885 | 4502 | 21214 | 8 | 160 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 5  | INSERT | 2023-02-03 15:26:07.124919 | 4502 | 21068 | 8 | 161 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 6  | INSERT | 2023-02-03 15:26:07.124950 | 4502 | 20882 | 8 | 161 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 7  | INSERT | 2023-02-03 15:26:07.124981 | 4502 | 3706  | 8 | 162 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 8  | INSERT | 2023-02-03 15:26:07.125012 | 4502 | 20961 | 8 | 162 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 9  | INSERT | 2023-02-03 15:26:07.125043 | 4502 | 21419 | 8 | 163 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 10 | INSERT | 2023-02-03 15:26:07.125075 | 4502 | 18639 | 8 | 163 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 11 | INSERT | 2023-02-03 15:26:07.125106 | 4502 | 21106 | 8 | 164 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 12 | INSERT | 2023-02-03 15:26:07.125137 | 4502 | 21389 | 8 | 164 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 13 | INSERT | 2023-02-03 15:26:07.125168 | 4502 | 20896 | 8 | 165 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 14 | INSERT | 2023-02-03 15:26:07.125199 | 4502 | 21292 | 8 | 165 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 15 | INSERT | 2023-02-03 15:26:07.125230 | 4502 | 10610 | 8 | 166 |
| <input type="checkbox"/>            | <a href="#">Edit</a>    | <a href="#">Copy</a> | <a href="#">Delete</a> | 16 | INSERT | 2023-02-03 15:26:07.125262 | 4502 | 20941 | 8 | 166 |
| <input checked="" type="checkbox"/> | <a href="#">Console</a> |                      |                        |    |        |                            |      |       |   |     |

Figure 7.15: Table for Invigilation Duty Chart

## **CHAPTER 8**

### **CONCLUSION AND FUTURE SCOPE**

#### **8.1 Goals of Proposed System**

##### **8.1.2 Operational Goal:**

Automates all business and functional processes thereby increasing overall efficiency.

##### **8.1.3 Customer Satisfaction:**

E-resource ERP solutions help in enhancing internal business processes and enable organizations to improve customer satisfaction.

##### **8.1.4 Easy Access:**

Our web-based ERP solution enables easy accessibility and availability of timely information, which results in better decision making and forecasting.

##### **8.1.5 Flexibility:**

E-resource ERP packages have a flexible and scalable structure thereby enabling organizations to adapt and cater to future business expansions and requirements.

##### **8.1.6 Cost Effective:**

E-resource ERP for Small and Medium Enterprises is affordable, quick to implement thus enabling the SMEs to focus on growth and improvement of their business rather than worrying about software and over and above, ERP work with you jointly to deliver the most favorable ERP solution for your organization, to help you further maximize your return on the investment

## **8.2 User Characteristics**

- Increase Operational efficiency
- Gain Business Visibility
- Improve Customer Relationship
- Streamline Production and Planning
- Optimize IT Investments
- Comply with Regulations
- Cut Cost
- Bring product to market sooner
- Monitor and control and expenses
- Reduce errors
- Get accurate, timely information
- Support your changing needs
- Make better business decisions
- Deliver the right product at the right time
- Keep customer promises
- Ability to modify/configure statutory changes
- Reduced product cost, reduced expediting
- Improved closure rates, Increased market share
- Improved sales and opportunity visibility better customer relationships, lower customer
- Global reach, better inventory visibility, reduced distribution costs, higher.

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Repository Link, [https://github.com/KIET-Github/CS-2024-A/  
tree/main/PCS24-58-Avinash](https://github.com/KIET-Github/CS-2024-A/tree/main/PCS24-58-Avinash)