Jahangirnagar University

SMART CLASS ROUTINE MANAGEMENT SYSTEM

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1 | INTRODUCTION

Smart Class Routine Management System

Recognizing the significance of efficient routine management, our Class Routine Management System aims to revolutionize the way schedules are managed. It focuses on dynamic routine management system that automates the scheduling process. From educational institutions to corporate environments, the task of creating schedules and managing time is crucial. For instance, constructing a department's class timetable demands substantial effort and precision, as the arrangement must align with the preferences of all users. Traditionally, this process involves manual efforts and consumes a significant amount of time.The laborious and challenging task of manually creating class timetables, which involves considerations such as teacher allocations, course timings, and avoiding conflicts, becomes significantly easier.

1.1 | Purpose

The primary purpose of developing the Class Routine Management System is to streamline and enhance the process of creating, managing, and communicating class schedules within universities. The system aims to offer a dynamic and automated approach to routine generation, ensuring optimal resource utilization, minimizing conflicts.

1.2 | Intended Audience

The target audience for this SRS includes a range of stakeholders involved in different aspects of the software development process and system utilization:

1. **Developers:** Responsible for coding and implementing the system's features and functionalities.
2. **Testers:** Professionals verifying the system's behavior against the specified requirements.

3. **Project Managers:** Individuals overseeing the project's planning and execution.
4. **System Administrators:** Individuals responsible for maintaining and managing the system's database and overall functionality.
5. **Teachers:** Educational professionals who will interact with the system for communication, scheduling and management.
6. **Students:** Users who will access the system to view class schedules and Academic calendar and receive class related notifications.
7. **Staff:** Users who can View Academic calendar and Class schedules.
8. **QA/QC Engineers:** Responsible for ensuring product quality.
9. **Business Analysta(BA):** Resposible for understanding and defining business requirements.
10. **Stakeholders:** Teams promoting the system's benefits and features to potential users and institutions.
11. **Investors:** Investors evaluate the system's potential for market success and financial returns to make informed funding decisions.

1.3 | Intended Use

The intended audience comprises various roles, each utilizing the system to enhance their specific responsibilities and contribute to the effective functioning of the institution.

1. **Developers:** Developers will use the SRS to understand both the functional and non-functional requirements of the system, ensuring that the system is developed to meet these requirements and maintain the necessary standards of quality.

2. **Tester:**Testers will use the SRS to understand the expected behavior of the system, develop comprehensive test cases, and ensure that all features are working as intended and free from defects.

3. **Project Managers:**Project managers hold a crucial role in overseeing the development and implementation of the Class Routine Management System. They will use the SRS to align project goals, monitor progress, and ensure that the final product aligns with the defined requirements.

4. **System Administrators :** System Administrators are responsible for ensuring the efficient operation of the departments. The SRS assists them in making informed decisions regarding system adoption, customization, and integration into existing workflows.

5. **Teachers:**Teachers are primary users of the system, relying on it to manage class schedules and communication with students. The SRS guides them in utilizing the system to enhance their teaching efficiency and effectiveness.

6. **Students:**Students are key beneficiaries of the system, utilizing it to access class schedules and receive notifications. The SRS guides students in maximizing the benefits of the system for academic success.

7. **Staff:**Staff members play a supporting role in the smooth functioning of the institution. They will use the Class Routine Management System to coordinating with faculty. The SRS provides them with an understanding of the system's capabilities in streamlining these processes.

8. **QA/QC Engineers:** Quality Assurance and Quality Control Engineers will utilize the SRS to create test plans, validate functionality, and ensure the system meets the required specifications and standards before it is released.

9. **Business Analysts (BAs):** BAs will leverage the SRS to gain insight into user needs and system requirements, enabling them to analyze and refine requirements, identify potential gaps, and ensure the system meets the organization's strategic goals.

10. **Stakeholders:**

    - **Leadership Teams:** Leadership teams will use the SRS to assess the system's features and benefits, ensuring it aligns with the institution's strategic objectives and enhances overall efficiency.
    - **Sales and Marketing:** These teams will refer to the SRS to understand the unique features and advantages of the system, enabling them to effectively market and promote it to potential customers.

11. **Investors:**Investors will use the SRS to evaluate the system's viability, potential market impact, and alignment with the institution's strategic vision, providing them with confidence in their investment decisions.

1.4 | Product Scope

The Class Routine Management System is a comprehensive software solution designed to make the scheduling and management of class routines within universities easier. This system encompasses a wide features, including user registration, personalized dashboards, notifications, rescheduling requests.

1. The system eliminates manual scheduling efforts, reducing the time and resources required for routine creation and adjustments.
2. The system sends notifications to each type of user, ensuring that they receive only the information relevant to them.
3. Efficient allocation of teachers, classrooms and courses ensures a well-organized and conflict-free routine.

Objectives:

1. Develop a smart routine management system that automates the scheduling process based on provided data.
2. Provide a user-friendly interface accessible to teachers, students, staff, exam committees, and system administrators.
3. Facilitate timely notifications regarding class schedules, changes, and updates.
4. Enable teachers to confirm, cancel, and request the rescheduling of class timings.
5. Offer administrators tools to review and resolve conflicts, ensuring an optimized schedule.
6. Implement secure user registration, login, and logout functionalities.
7. Allow modification of information related to teachers, students, staff, department chairpersons, departments, sessions, exam years, and courses for accurate record-keeping.

8. Facilitate access to syllabus and the academic calendar.

9. Generate a class routine for each semester using an algorithm, integrating this routine with the university's academic calendar to create semester schedules.

10. This system enables exam committee representatives to monitor the class progress of the sessions under their supervision. It also allows them to approve class cancellation and rescheduling requests from teachers for the semester they oversee.

Risk Definitions:****

1. Reduce manual efforts and time invested in routine management

Goals:

1. Reduce manual efforts and time invested in routine management
2. Minimize scheduling conflicts and errors through intelligent algorithms and conflict resolution mechanisms
3. Provide a dynamic and adaptable solution that meets the diverse needs of different academic departments

Business Goals: The Class Routine Management System directly aligns with the broader business goals of universities. By streamlining routine management, enhancing communication, and optimizing resource allocation, the system contributes to the institution's commitment to providing an enriching learning experience. The system's automation ensures time and cost savings

2 | OVERALL DESCRIPTION

2.1 | User Classes and Characteristics

In this academic scheduling system, user classes are designed to meet the specific roles and needs of teachers, students, superusers, exam committee members, and staff. Each class has distinct responsibilities and interactions with the system.

2.1.1 | Superusers

Characteristics:

- **Generate Routine:** Superusers generate class schedules for departments, considering teacher preferences, time slots, and room availability.
- **Manage Room Assignments:** Superusers handle room assignments, ensuring that rooms are appropriately allocated for theory and lab classes.
- **Review and Approve Requests:** Superusers review and approve requests for class rescheduling and other administrative tasks.
- **Maintain System Integrity:** Superusers oversee system operations and ensure the overall functionality and accuracy of the scheduling process.

2.1.2 | Teachers

Characteristics:

- **Access and Manage Courses:** Teachers view and manage the courses they are assigned to, including updating course details and accessing the syllabus.
- **View and Filter Syllabus:** Teachers can view and filter the syllabus for their courses, selecting specific portions they want to review or display.
- **Download and Print:** Teachers can download or print the syllabus and other relevant documents for their records.
- **Update Profile:** Teachers maintain their profiles, ensuring that their personal and professional information is current.

2.1.3 | Students

Characteristics:

- **View Class Routine:** Students access their class schedules and receive notifications of any changes or updates to their routine.
- **Access and View Syllabus:** Students view the syllabus for their courses, including learning objectives, chapters, and other relevant details based on their academic year.
- **Download Syllabus:** Students have the option to download the syllabus for their entire academic year or specific courses as a PDF for future reference.
- **Manage Profile:** Students keep their profiles updated with accurate information, including contact details and academic status.

2.1.4 | Exam Committee Members

Characteristics:

- **Schedule Exams:** Exam committee members schedule exams for various courses, ensuring alignment with the academic calendar and available resources.
- **Manage Exam Information:** They handle and update exam details, including dates, times, and venues.
- **Review Requests:** Committee members review requests related to exam schedules and adjustments.
- **Coordinate with Teachers:** They communicate with teachers to finalize exam arrangements and ensure smooth execution.

2.1.5 | Staff

Characteristics:

- **Support Routine Generation:** Staff assist with the routine generation process by providing necessary information and handling administrative tasks.

- **Update Information:** They manage and update the data related to rooms, schedules, and other logistical details.
- **Assist Users:** Staff provide support to teachers, students, and superusers, addressing any issues or queries related to the scheduling system.
- **Monitor System Operations:** Staff help monitor system performance and ensure that all features are functioning correctly.

2.2 | User Needs

The Class Routine Management System serves distinct user classes, each with specific characteristics and roles within the universities. These user classes encompass a wide range of responsibilities, from routine management to decision-making.

1. **Teachers:**
   [a] **Needs:**Confirm, Cancel and Reschedule class that are previously scheduled. Viewing academic calendar. Viewing Syllabus and download as PDF file.
2. **Students:**
   [a] **Needs:** Receive confirmed class schedule including the class timing for the next day, view academic calendar and syllabus.
3. **Staff:**
   [a] **Needs:** Receive confirmed class schedules, including the timings for the next day, for the classroom they are responsible for.
4. **Exam Committee:**
   [a] **Needs:** Real-time course progress monitoring[make up class scheduling if course progress is not satisfactory], declaring exam dates.
5. **System Admins:**
   [a] **Needs:** Upload Teacher, Student, Department, Session, Exam year information. Upload Syllabus. Generate class routine and integrate the class routine with universities academic calendar to generate class schedules for one semester. Update all the information in the system.

3 | Operating Environment

3.1 | Hardware Platform

- **Desktops:** Intel Core i5 processor or equivalent, 8GB RAM, 256GB SSD or higher.
- **Laptops:** Intel Core i3 processor or equivalent, 4GB RAM, 128GB SSD or higher.
- **Mobile Devices:** iOS devices (iPhone 6S and above), Android devices (Android 8.0 and above).

3.2 | Operating System and Versions

- **Windows:** Windows 10 (64-bit), Windows 11 (64-bit).
- **macOS:** macOS Catalina (10.15) and above.
- **Linux:** Ubuntu 20.04 LTS and above, Fedora 33 and above.
- **Mobile:** iOS 13 and above, Android 9.0 and above.

3.3 | Software Components and Applications

- **Web Browsers:** Google Chrome, Mozilla Firefox, Microsoft Edge, Safari (latest stable versions).

3.4 | Database Compatibility

- **Databases:** MySQL (version 8.0)

3.5 | Interoperability

- **Standards:** RESTful APIs and JSON data interchange standards.

3.6 | Network Requirements

- **Connection:** Stable internet with 5 Mbps minimum bandwidth.
- **Supported:** Wired (Ethernet) and wireless (Wi-Fi).

3.7 | Security Considerations

- **Encryption:** TLS encryption (SSL certificates) for secure data transmission.
- **Compliance:** Adheres to industry data security standards.

4 | Constraints

4.1 | Technical Constraints

- **System Scalability:** The system needs to handle up to 500 simultaneous active users during peak usage times.

4.2 | Performance Constraints

- Routines should be generated within 2 seconds after uploading relevant files.

- The interface must load within 2-3 seconds, especially for data-heavy screens like schedule views and syllabus files.

4.3 | Time Constraints

- **Real-Time Updates:** Schedule changes must be reflected in the system within 2-3 seconds of modification.

- **Development Phases:**

  - **Feature Implementation Deadlines:** Core features such as routine generation, file uploads, and academic data management must be completed within 2-3 months.

  - **Testing and Deployment:** A testing window of 3-5 weeks is needed to ensure that routines are generated correctly without overlaps or scheduling conflicts, directly impacting launch readiness.

4.4 | Budget Constraints

- Allocation of resources for development (proficiency in Node.js, SQL, ReactJS, and database optimization techniques), cloud hosting, and maintenance efforts.

4.5 | Regulatory and Compliance Constraints

- **Data Protection Requirements:**
  - **Data Privacy Regulations:** The system must comply with data protection laws to ensure the secure handling of personal information.
  - **Security Standards:** The system must comply with security standards to protect against data breaches, unauthorized access and other cybersecurity threats.

4.6 | Resource Constraints

- **Server Capacity:** The system requires dedicated servers with at least 8 GB RAM (for system administrators) to handle routine generation algorithms and multiple concurrent database transactions efficiently.

4.7 | User Experience Constraints

- **Training and Onboarding:** A minimum of 5 hours of training per user role (Super User, Teacher) is required to ensure effective use of the system.

5 | Assumptions

1. The system maybe unavailable if the internet server is down .

2. Users, including teachers, students, staffs and Class Representatives, are assumed to have a basic level of digital literacy and familiarity with web-based applications, allowing them to navigate the system's features and functionalities.

3. It is assumed that system administrators and relevant personnel will update the system's database promptly to reflect changes in course schedules, teacher assignments, and classroom availability. Delays in data updates may lead to inconsistencies in the generated routines.

4. Users are assumed to actively engage with the system, regularly checking notifications, accessing dashboards etc. Low user engagement may limit the system's effectiveness in achieving its intended goals.

5. We assume that for system has enough memory to share big files.

6. We assume in case if any teacher comes or leaves for higher studies in the mid of the course the system should update the course related info as soon as possible.

7. We assume that there are enough classrooms in the departments to manage the case of any contradiction of time in the routine.

6 | Risk Definitions

6.1 | Technical Risks

Challenges related to system scalability may lead to performance degradation, especially during peak times.

6.2 | Data Security Risks

Handling sensitive data like teacher and student information poses risks related to data breaches and unauthorized access.

6.3 | Regulatory Risks

Non-compliance with data privacy laws and security standards can result in legal consequences and damage the institution's reputation.

6.4 | Performance Risks

Delays in routine generation or slow interface response times could impact user experience, leading to dissatisfaction among super users and teachers.

6.5 | Time Risks

Tight development schedules with set deadlines for core features and testing phases could lead to rushed implementations, increasing the chances of bugs and system failures.

6.6 | Resource Risks

Limited availability of skilled developers and infrastructure resources could constrain the project's ability to meet performance and scalability requirements.

Understanding these risks is essential to implementing mitigation strategies, such as rigorous testing, regular backups and ensuring compliance with security standards to safeguard the project's success.

7 | Functional Requirements

The functional requirements of the project include:

1. **User Login:** This feature should provide a secure login mechanism for users to access their accounts.
2. **Personalized Dashboard:**The system should provide a personalized dashboard for each user (teachers, students, staffs and Superuser) upon login.
3. **Generating Routine:**The system should allow the superuser to generate a class routine for a department. This routine must take into account teacher preferences, time slots, and room availability. It should allow flexible scheduling and provide options for both theory and lab classes, considering the number of classes per week and the specific room types required.
4. **Generating Makeup Routine:** This feature should generate a makeup class routine(out of the normal class schedule) based on the number of classes(if number of classes is below the threshold) for each particular course.
5. **View Academic Calendar:** This feature provide different view format(by week, month or only vacations etc) of academic calendar.
6. **Assign Course Teacher:** This feature enables a SuperUser (SU) to assign teachers to courses for a specific exam year within a particular session using either a CSV file upload or a manual interface. The SU can upload a CSV file containing course and teacher assignments. The system will validate the file for correct format and data consistency, processing it to update course assignments accordingly. Alternatively, the SU can manually assign teachers through an interface. By selecting a course and pressing the "Assign Teacher" button, a list of available teachers is displayed. The SU can then select one or more teachers and save the assignment, updating the course records. Additionally, the SU can update existing teacher assignments for each course, adding or removing

teachers as needed. The system will validate all assignments and notify teachers about their new or updated assignments, while the SU receives confirmation of the changes.

7. **Schedule Class:** This feature allows teachers to manage their class schedules by confirming, canceling, or requesting rescheduling of classes. Teachers can view their current schedule and choose to confirm or cancel a class with a single action, providing a reason for cancellation if needed. If rescheduling is required, teachers can propose new time slots from available options. These rescheduling requests are sent for approval to the Exam Committee of the exam year of that particular session, and teachers are notified of the status of their requests. The system will update the class schedule accordingly and handle any scheduling conflicts that arise, ensuring that all affected students and stakeholders are informed of the changes.

8. **Filter Syllabus:**Teachers and students should be able to filter and view the syllabus for one or more courses based on the specific courses they teach Oor their academic year .

9. **Upload File:** This feature should allow uploading different formats of files(csv, xml, pdf etc) for storing information of teacher, students, staffs and system administrators.

10. **Request for Rescheduling Class Timing:** The system should provide a feature that allows teachers to submit a request for rescheduling a class, providing the reason and preferred alternative timings.

11. **View Class Routine:** This feature enable the Students, Teachers and Staffs to get notified about the dynamic Class Routine.

12. **Approve Rescheduling Class:** The system should notify the admin whenever a reschedule request is received.The admin should be able to access the details of the request, review the reason for rescheduling and make an informed decision.

13. **View Class Representative Information:** This feature includes displaying detailed information about the class representative such as

name, photo, contact details and assigned batch. This feature should allow users to easily access the representative's information as needed.

14. **Update Class Representative Information:** This system includes allowing administrator to modify the details of the class representative such as name, contact information and assigned batch. This feature should ensure that any changes are saved and reflected accurately in the system.

8 | Non-Functional Requirements

The non-functional requirements of the system include:

1. Performance Requirements

- **Response Time**: The system should respond to user actions (e.g., routine generation, class scheduling) within 2 seconds under normal conditions.
- **Scalability**: The system must handle up to 10,000 concurrent users without degradation in performance.
- **Throughput**: The system should be able to process and update class schedules and room availability for up to 1,000 classes per hour.
- **Batch Processing**: Bulk data uploads (CSV or XML files) for syllabus or course assignment should be processed within 5 minutes for files containing up to 10,000 records.

2. Availability and Reliability

- **System Uptime**: The system should be available 99.9% of the time (maximum downtime of 8.76 hours per year).
- **Failover Support**: In case of hardware failure, the system should automatically switch to a backup server within 1 minute.
- **Data Consistency**: All class schedules, teacher assignments, and room allocations should be consistent and correctly reflected across all system components without delay.

3. Security Requirements

- **User Authentication**: The system should support role-based authentication (teachers, students, staff, super users) using secure password storage (e.g., hashed passwords with salt).
- **Data Encryption**: Sensitive data, such as user credentials and personal information, must be encrypted during transmission using TLS (SSL certificates).
- **Access Control**: Different levels of access should be provided based on user roles (e.g., only super users can assign teachers, and only teachers can confirm or cancel classes).
- **Audit Logging**: All critical actions (class cancellation, routine updates, teacher assignments) should be logged for auditing purposes, with timestamps and user information.

4. Usability Requirements

- **User Interface**: The system should provide a clear, intuitive, and responsive UI, accessible on both desktop and mobile devices.
- **Mobile Compatibility**: The interface must be fully functional on mobile browsers (Chrome, Safari, Firefox, Edge) and scale appropriately for various screen sizes.
- **Accessibility**: The system should comply with accessibility standards (e.g., WCAG 2.1) to ensure it is usable by individuals with disabilities.

5. Maintainability and Modularity

- **Code Maintainability**: The system's codebase should follow clean coding principles and be modular, ensuring easy updates and bug fixes.
- **Documentation**: The system should be well-documented, including API documentation, user manuals, and developer guidelines.
- **Versioning**: The system should use version control (e.g., Git) to track changes and updates to the codebase, supporting rollback in case of issues.

6. Scalability and Extensibility

- **Horizontal Scalability**: The system must be able to handle increased load by adding more servers or cloud instances.
- **Modularity for New Features**: The system should be designed in a way that new features (e.g., support for new types of classes or rooms) can be added with minimal changes to the core structure.

7. Data Backup and Recovery

- **Automatic Backups**: Data should be backed up automatically on a daily basis to prevent data loss in the event of a failure.
- **Recovery Time Objective (RTO)**: In case of system failure, the system should recover and be fully functional within 2 hours.
- **Recovery Point Objective (RPO)**: The maximum acceptable data loss should be limited to 15 minutes.

8. Interoperability

- **API Support**: The system should provide RESTful APIs for integrating with other systems, such as university portals or student information systems (SIS).
- **Data Formats**: The system should support standard data formats (e.g., JSON, CSV, XML) for data import/export.

9. Compliance Requirements

- **Data Privacy**: The system must comply with data protection laws (e.g., GDPR, CCPA), ensuring that personal data is collected, stored, and processed securely.
- **Legal Compliance**: The system should adhere to any educational standards and regulations required by institutions or government bodies.

10. Logging and Monitoring

- **System Logs**: The system should log all critical events, including user logins, class schedule updates, and room assignments.
- **Monitoring**: Real-time monitoring should be in place for tracking system performance, user activity, and potential security threats.

11. Capacity and Storage

- **Storage Requirements**: The system must be capable of storing data for multiple academic years, including historical class schedules, with no performance degradation.

12. Disaster Recovery

- **Disaster Recovery Plan**: A comprehensive disaster recovery plan should be in place to restore services within a short time frame in case of catastrophic failure (e.g., fire, flood, cyberattack).
- **Offsite Backups**: Regular backups should be stored in an offsite location to ensure data recovery in case of localized damage.

9 | User Story

9.1 | SuperUser Registration:

As an administrator, I want to register a new SuperUser by accessing a specific URL and using a generated registration link, so that a new SuperUser account can be created with proper credentials and a password.

Confirmation:

Success -

1. **Accessing SuperUser Registration URL:**

   The administrator accesses a specific URL set by the authority that includes a "Generate SuperUser" button.

2. **Generating SuperUser Registration Link:**

   Upon clicking the "Generate SuperUser" button, the system sends an email containing a hashed link to the university's administrative email address.

3. **Accessing the Registration Page:**

   The administrator receives the email and clicks on the hashed link, which redirects them to the SuperUser registration page.

4. **Creating SuperUser Account:**

   On the registration page, the administrator fills in the SuperUser's profile details, including credentials and password.

   The administrator clicks "Save" to create the SuperUser account.

5. **Confirmation of Account Creation:**

   If the SuperUser account is successfully created, the system displays a confirmation message: "SuperUser account has been successfully created."

6. **Sending Password to New SuperUser:**

   An email containing the SuperUser's password is sent to the newly created SuperUser's email address.

Failure -

1. **Error Accessing Registration URL:**

   Message: "Unable to access the registration URL. Please ensure the URL is correct and try again."

   Reason: The URL might be incorrect or the registration page may be down.

2. **Error Generating Registration Link:**

   Message: "Failed to generate the SuperUser registration link. Please try again later or contact support."

   Reason: System issues or errors in the link generation process.

3. **Expired Registration Link:**

   Message: "The registration link has expired. Please request a new registration link."

   Reason: The registration link has surpassed its validity period and can no longer be used.

4. **Invalid Registration Link:**

   Message: "The registration link is invalid. Please check the link or

contact support."

Reason: The link may have been tampered with or was not properly generated.

5. **Error Accessing Registration Page:**

   Message: "Unable to access the registration page. Please check the link or contact support."

   Reason: The registration page might be unavailable or there could be a problem with the URL.

6. **Error Creating SuperUser Account:**

   Message: "Failed to create the SuperUser account. Please check the details and try again."

   Reason: Issues with the account creation process, such as invalid details or system errors.

7. **Unsuccessful Email Sending:**

   Message: "Failed to send the SuperUser account password. Please try again later or contact support."

   Reason: Email service issues or errors in sending the password email.

9.2 | User Login:

As a user, I want to log in to the Smart Class Routine Management System (SCRMS) so that I can access the system using my credentials.

Confirmation:

Success -

1. **Redirecting to the Login Page:**

   If the user had logged out in the last session or the session duration is over, they are redirected to the login page.

2. **Session Remember Option:**

   On the login page, the user has the option to remember their session and save their credentials for a limited time.

3. **Redirecting After Successful Login:**

   After logging in with valid credentials, the user is redirected based on their role:

   [a] **SuperUser:** Redirect to the SuperUser dashboard.

   [b] **Teacher:** Redirect to the Teacher dashboard.

   [c] **Student:** Redirect to the Student dashboard.

   [d] **Staff:** Redirect to the Staff dashboard.

4. **Active Session Redirect:**

   If the user's session is still active and valid, redirect them directly to the Home page based on their role.

5. **Verification for Unknown Device/Location:**

   If login is attempted from an unknown device or location:

   [a] Send a confirmation email and SMS to the user's registered email and contact number for verification.

   [b] Upon successful verification, allow access to the system.

6. **Forgotten Password Recovery:**

[a] Send an email containing the reset password link. By clicking on the link, the user is taken to a reset password page.

[b] Send an OTP to the user's registered contact number.

[c] Upon validating the OTP, allow the user to reset their password.

[d] Update the password in the database after the reset.

7. **Welcome Message:**

   After login, a personalized welcome message is displayed based on the user's role (SuperUser, Teacher, Student, Staff).

8. **Personalized Dashboard Redirection:**

   Redirect the user to their appropriate dashboard with personalized data.

Failure -

1. **Invalid Credentials:**

   Message: "Incorrect email or password." Allow up to three retries before locking the account for 10 minutes.

2. **Unverified Device/Location:**

   Message: "Access denied. Device or location verification failed. Please try again or contact support."

3. **Suspended Account:**

   Message: "Your account has been suspended. Please contact the administrator."

4. **Unusual Activity:**

   Message: "Unusual activity detected. Your account has been locked. Please contact the administrator for manual verification."

5. **Session Expiration:**

   Message: "Your session has expired. Please log in again."

6. **Accessing Unauthorized Sections:**

   Message: "You do not have permission to access this section." Redirect the user to their appropriate dashboard.

9.3 | Forget Password:

As a user, I want to reset my password if I forget it, so that I can regain access to the system. I should have the option to choose how I want to reset my password: via email reset link or OTP sent to email or phone.

Confirmation:

Success -

1. **Accessing the Forget Password Page:**

   The user clicks on the "Forget Password?" button from the login page, which redirects them to a page where they can choose the method for resetting their password.

2. **Choosing Reset Method:**

   [a] **Reset via Email Link:**

   The user selects the option to receive a reset password link via email.

   The user enters their registered email address and clicks "Send Reset Password Link."

   If the email is valid, the system sends a password reset email with a unique, time-sensitive link.

   If the email is invalid, the user sees: "The email is invalid or unrecog-

nized email ID."

[b] **Reset via OTP:**

The user selects the option to receive an OTP via email or phone.

The user enters their registered email address or phone number and clicks "Send OTP."

If the email/phone is valid, the system sends an OTP to the specified contact method.

If the email/phone is invalid, the user sees: "The email or phone number is invalid or unrecognized."

3. **Using Reset Link:**

Upon receiving the reset link email, the user clicks the link, which redirects them to the reset password page.

The user enters and confirms the new password.

If the passwords match, the system updates the password and displays: "Your password has been successfully reset."

The user is then redirected to the login page.

If the passwords do not match, the user sees: "Passwords do not match. Please try again."

4. **Using OTP:**

The user receives an OTP and enters it on the reset password page.

If the OTP is valid and not expired, the user is allowed to enter and confirm the new password.

If the OTP is invalid or expired, the user sees: "Invalid or expired OTP. Please request a new OTP."

5. **Password Update:**

   After successfully resetting the password via email link or OTP, the user is redirected to the login page.

   The user logs in with the new password and gains access to the system.

Failure -

1. **Invalid Email or Phone Entry:**

   Message: "The email or phone number is invalid or unrecognized."

2. **Expired Reset Link:**

   Message: "The reset link has expired. Please request a new password reset link."

3. **Mismatched Passwords:**

   Message: "Passwords do not match. Please try again."

4. **Attempt to Use an Expired OTP:**

   Message: "The OTP has expired. Please request a new OTP."

5. **Invalid OTP:**

   Message: "Invalid OTP. Please try again."

6. **Unsuccessful Password Save:**

   Message: "Failed to save your new password. Please try again."

7. **Reset Link Already Used:**

   Message: "This reset link has already been used. Please request a new link."

8. **Multiple Failed Attempts:**

   Message: "You have reached the maximum number of attempts. Please try again later or contact support."

9. **Forgot Password Without Valid Contact:**

   Message: "Your email or phone number is not registered. Please check and try again."

9.4 | SuperUser Password Reset:

As a SuperUser, I want to reset the password for any user account (Teacher, Student, Staff) directly, so that I can manage user accounts effectively.

Confirmation:

Success -

1. **Accessing User Management:**

   The SuperUser navigates to the user management interface and selects the user account (Teacher, Student, Staff) for which they want to reset the password.

2. **Resetting Password:**

   The SuperUser chooses to reset the password for the selected user.

   The system provides an option to generate a new temporary password or reset via email/OTP.

   The SuperUser can update the password directly or initiate a password reset process.

   A confirmation message is displayed: "Password has been successfully reset for the selected user."

Failure -

1. **Invalid User Account:**

   Message: "The selected user account is invalid or does not exist."

2. **Unsuccessful Password Update:**

   Message: "Failed to reset the password. Please try again."

3. **Reset Process Failure:**

   Message: "The password reset process failed. Please ensure all details are correct and try again."

4. **Access Denied:**

   Message: "You do not have permission to reset the password for this user account."

9.5 | Assign Course Teacher:

As a Super User, I want to assign one or more teachers for each of the courses in an exam year so that the courses have assigned teachers.

Confirmation:

Success -

1. **Prerequisite Check:**

   The prerequisite for assigning course teachers is that the courses need to be uploaded for the exam year.

2. **Uploading the CSV File:**

[a] The Super User navigates to the ExamYear page of a particular session.

[b] The Super User uploads a CSV file containing the course and the assigned course teacher.

3. **Successful File Upload:**

[a] If the file uploading process is successful:

i. The update will reflect across the system.

ii. The courses will have assigned course teachers.

Failure -

1. **Incorrect CSV Format:**

[a] If the format of the CSV file doesn't match the format of the table `AssignedCourseTeacher` in the database:

i. An error will pop up asking to provide the correct format of the CSV file.

2. **File Upload Failure:**

If the file uploading process fails for any reason:

[a] An error message will be displayed indicating the failure of the file upload.

9.6 | Scheduling Class:

As a Teacher, I want to schedule my class so that I may be able to confirm, cancel, and reschedule my class.

Confirmation:

Success -

1. **Selecting the Date:**

   The teacher selects the exact date to confirm, cancel, or reschedule the class.

2. **Viewing Unconducted Classes:** Only the classes of the teacher that are not conducted will be shown in the list.

3. **Confirming the Class:** If the class is confirmed before a threshold time, a notification will be sent to the student profiles associated with that session. Additionally, the staff of the classroom will be notified.

4. **Confirmation Process:** To confirm a previously scheduled class, the teacher presses the "Class Confirm" button from the list. A notification is sent to the student profiles and the staff of the classroom.

5. **Rescheduling the Class:** If the teacher presses the "Reschedule" button, a popup window will appear with a form. The form includes:

   [a] A dropdown menu to select the class to reschedule.

   [b] A list of free time slots based on the best choices determined by the system's algorithm.

Failure -

1. **Confirmation Reminder:** If the class is not confirmed before a threshold time, a notification will be sent to the teacher profile to remind them of the pending confirmation.

2. **Cancellation Deadline:** If the teacher attempts to cancel the class after the allowed time (e.g., after 9:00 PM the previous day), the cancellation request will not be processed.

3. **Cancellation Request:** If the teacher presses the "Cancel" button, a request is sent to the representative of the exam committee. The class will only be canceled if the representative approves the cancellation request. If not approved, the class remains scheduled.

4. **Cancellation Denial:** If the cancellation request is made within the allowed time but is not approved by the exam committee representative, the class will not be canceled, and the teacher will be notified of the denial.

5. **Rescheduling Slot Availability:** If the teacher selects a time slot for rescheduling that is not available according to the teacher's preferred range, the system will notify the teacher and suggest alternate available slots for the class.

9.7 | Recording Teachers' Time Preferences via Email Link

As a superuser, I want to record each teacher's preferred time ranges for each working day separately via a link sent to their email, so that I can collect their availability for scheduling classes efficiently.

Confirmation:

Success -

1. **Email Invitation Sent:**
   The system successfully sends an email to each teacher containing a unique link to input their preferred time ranges for each working day.

2. **Teacher Opens the Link:** The teacher clicks the link in the email and is directed to a form where they can enter their preferred time ranges (e.g., 9:00 AM - 12:00 PM for Monday).

3. **Providing Time Ranges for Each Day:** The teacher provides different preferred time ranges for each day of the week (e.g., Monday: 9:00 AM - 12:00 PM, Tuesday: 1:00 PM - 3:00 PM).

4. **Submitting Preferences:** The teacher submits their preferences, and the system confirms successful submission.

5. **Saving Data in Database:** The system stores the teacher's preferred time ranges in the database, associating the data with the respective teacher profile.

6. **Superuser Views Preferences:** The superuser can view and access the stored teacher preferences for scheduling purposes.

Failure -

1. **Email Sending Failure:**

   Message: "Failed to send the email invitation. Please check the email addresses and try again."

2. **Link Expiration or Invalid Link:**

   Message: "The link has expired or is invalid. Please contact the administrator for a new link."

3. **Teacher Submission Incomplete:**

   Message: "Preferred time ranges are incomplete for one or more days. Please complete the form before submitting."

4. **Database Saving Failure:**

   Message: "Failed to save the teacher preferences in the database. Please try again."

9.8 | Generate Routine

As a superuser,I want to generate a routine for a department so that the department's classes can be scheduled efficiently, accounting for teacher preferences, available time slots and room availability.

Confirmation:

Success -

1. **Selecting a Department:**

   The user selects a department from a dropdown menu listing all available departments.

2. **Defining the Number of Slots:** The user inputs the number of daily class slots (e.g., 4 or 5) for the selected department.

3. **Defining Slot Duration:** The user selects the duration of each class slot for that department from a number of available options.

4. **Selecting Start and End Time of the Day:** The user specifies the start and end times for the class day of that department (e.g., 9 AM to 5 PM).

5. **Defining the Duration and Time of Lunch Break:** The user selects the duration and the specific time when the lunch break will occur, based on the already defined class slots and duration.

6. **Specifying the Class Counts per Week:** The system retrieves the class count data for each course from a file stored in the database. The file contains information on how many classes each course in the department

will have per week**(e.g., theory classes twice a week, lab classes once a week)**.

7. **Defining the Duration of Specific Classes through Files**

   [a] Super users will upload a file that specifies the duration for each course. The file should include details such as the course name and the required duration in class slots or total minutes.**(e.g., a lab class that takes up two theory slots)**, the user specifies the number of regular slots required for that course.

8. **Selecting Number of 'Regular Classrooms' available in the department:** The user selects the number of regular classrooms available in the department.

9. **Selecting Specialized Classroom Categories and Keeping their Counts:**

   [a] The user selects the category of specialized classrooms available in the department (e.g., *'Circuit Lab'*, *'Computer Lab'*).

   [b] For each category, an option appears for selecting the name of that category and specifying the number of rooms available in the department for that category. (i.e In Dept. of CSE,Jahangirnagar University,there are *2* categories of dedicated rooms -

      i. Computer Lab(3 rooms)

      ii. Circuit Lab(1 room)

10. **Specifying Courses according to Dedicated Rooms:**

[a] The system retrieves the course-room specifications(type of room needed for each course) from the database.

[b] The superuser can also make real time modifications for the type of room needed for each course by choosing between ***'regular' and 'specialized' rooms***. Specialized rooms are further classified according to the available specialized rooms in the department, such as ***circuit labs*** for circuit classes and ***computer labs*** for programming or networking courses.

11. **Viewing and Applying Teacher Preferences:**

    [a] The system displays a list of all teachers in the selected department, along with **their preferred time ranges for each working day**, which were recorded earlier via email links. The preferences will guide the routine generation, ensuring that classes are scheduled based on each teacher's availability.

12. **Generating the Routine:** The user clicks "Generate Routine." The system processes all the inputs, creates the class schedule, and displays it for review.

Failure -

1. **Department Selection Failure:**

   Message: "Department selection failed. Please try again."

2. **Number of Slots Not Defined:**

   Message: "Number of class slots is missing. Please define the number of slots to proceed."

3. **Slot Duration and Break Time Not Defined:**

   Message: "Class duration or break time not specified. Please provide the duration for each slot and the break time."

4. **Start and End Time Not Specified:**

   Message: Start and end times of the day are missing. Please set the working hours to proceed."

5. **Lunch Break Not Scheduled:**

   Message: "Lunch break time not provided. Please specify when the break will occur."

6. **Class Count Not Specified for Courses:**

   Message:“Unable to retrieve class counts for courses from the file. Please ensure the file is correctly stored in the database and contains all necessary data”.

7. **Class Duration for Specific Courses Not Defined:**

   Message: "Combined slot duration for a specific course is not provided. Please ensure the file is correctly stored in the database and contains all necessary data”.

8. **Regular Classroom Count Not Selected:**

   Message: "Number of regular classrooms available in the department is not selected."

9. **Specialized Classroom Category Not Selected:**

   Message:"Category of specialized classroom not selected. Please select the type and number of specialized room"

10. **Room Type Not Specified for Courses:**

Message: ""Unable to retrieve course-room specifications from the database. Please ensure the data is correctly stored or updated in the database." "

11. **Teacher Preferences Not Recorded:**

Message: "Teacher preferences for time slots or days are incomplete."

12. **Routine Generation Failure:**

Message: "Failed to generate the routine due to incomplete or conflicting inputs. Please review the inputs and try again."

9.9 | Generate Makeup Class Routine

As a user, I want to create a Makeup Class Routine so that if enough classes are not performed for any particular course, it can be compensated.

Confirmation:

Success -

1. **Selecting a Course and Type:**

   The user selects a course and type (Lab or Theory). If classes held for the course are below the threshold level, show: "The course needs makeup class." If not: "No need of makeup class for that course."

2. **Defining the Number of Slots:**

   The user inputs the number of class slots for a particular day.

3. **Defining Slot Duration:**

   The user selects the duration of the makeup class slot.

4. **Selecting Start and End Time for Makeup Class:**

   The user specifies the start and end times for the class.

5. **Defining the Duration and Time of Lunch Break:**

   The user selects the duration and time of lunch break if there's a long period defined.

6. **Selecting Number of Regular Classrooms:**

   The user selects the number of regular classrooms available.

7. **Selecting Specialized Classroom Categories:**

   The user selects the category of specialized classrooms available (e.g., Circuit Lab, Computer Lab).

8. **Generating the Routine:**

   The system processes inputs and generates the makeup class routine.

Failure -

1. **Course Name and Type Selection Failure:**

   Message: "Department selection failed. Please try again."

2. **Number of Slots Not Defined:**

   Message: "Number of class slots is missing. Please define the number of slots to proceed."

3. **Slot Duration and Break Time Not Defined:**

   Message: "Class duration or break time not specified. Please provide the duration for each slot and the break time."

4. **Start and End Time Not Specified:**

   Message: "Start and end times are missing. Please set the working hours to proceed."

5. **Lunch Break Not Scheduled:**

   Message: "Lunch break time not provided. Please specify when the break will occur."

6. **Specialized Classroom Category Not Selected:**

   Message: "Category of specialized classroom not selected. Please select

the type and number of specialized rooms."

7. **Routine Generation Failure:**

   Message: "Failed to generate the makeup class routine due to incomplete or conflicting inputs. Please review and try again."

9.10 | Upload Files

As a Super user, I want to upload files so that I can store various information of departments, students, teachers, and faculties.

Confirmation:

Success -

1. **Selecting a valid file format:**

   User selects a valid CSV or XML file containing accurate data for students, teachers, or other users.

2. **Categorize uploading file format in respect to user account and syllabus:**

   Accepted file formats for accounts and courses are CSV, while for viewing the syllabus, XML is required.

3. **For accurate file syntax:**

   If the file has the correct format and syntax, show: "File Uploaded Successfully." The table for storing information is created in the database, and the admin can view a list of successfully created accounts.

Failure -

1. **Not selecting correct file format:**

   Message: "Error in file uploading."

2. **Syntax of the file not correct:**

   Message: "Error in file uploading."

9.11 | Filter Syllabus (Teacher):

As a teacher, I want to fetch the syllabus for the courses I teach so that I can easily access and review the course details, including learning objectives, chapters, and other criteria.

Confirmation:

Success -

1. **Redirecting to the Syllabus Filtering Interface:**
   Upon logging in, the teacher can redirect to the syllabus filtering interface from the navigation bar.

2. **Session and Course Retrieval:** Based on the teacher's login information, the system automatically retrieves their associated department and presents a list of available sessions and courses for selection.

3. **Selecting the Session (Batch):**
   [a] The teacher selects the session or batch (e.g., 2019-2020) from the list provided.
   [b] The system then displays the available courses for that session.

4. **Selecting Single or Multiple Courses:**
   [a] The teacher is presented with a list of courses relevant to the selected session.
   [b] He/She can select either a single course or multiple courses (e.g., "CSE 403", "CSE 404") from the list.

5. **Selecting Syllabus Portions to View:**

[a] After selecting the courses, the teacher is given the option to filter specific portions of the syllabus. Options include:

i. Student Learning Outcomes

ii. Recommended Books

iii. Chapters

iv. Course Credit

v. Contact Hours

vi. Course Title

[b] The teacher selects one or multiple portions they want to view.

[c] **Fetching the Syllabus:**

i. After making the necessary selections, the teacher clicks the "Fetch Syllabus" button.

ii. The system retrieves and displays the syllabus based on the selected courses and portions in either a consolidated or separate view.

[d] **Displaying the Filtered Syllabus:**

i. The filtered syllabus appears on the screen, showing all the requested details, either for multiple courses or separately for each course.

ii. The teacher can view each course's learning objectives, chapters, required readings, contact hours, and more.

[e] **Downloading the Syllabus:**

i. The teacher is given the option to download the syllabus for the selected courses.

ii. The system provides an option to download either separate files for each course or a merged document containing the syllabus for all selected courses.

Failure -

[a] **Redirect Failure:**

Message: "Unable to redirect to the syllabus filtering interface. Please try again later."

[b] **Session Selection Error:**

Message:"No sessions found for your department. Please verify your session or contact the administrator."

[c] **Course Selection Failure:**

Message: "No courses available for the selected session. Please check your session or contact the administrator."

[d] **Syllabus Portion Selection Error:**

Message: "You must select at least one portion of the syllabus to proceed."

[e] **Syllabus Fetch Failure:**

Message: "Failed to retrieve syllabus. Please check your selection and try again."

[f] **Display Failure:**

Message: "Unable to display the syllabus. Please try again later."

[g] **Download Failure:**

Message: "Failed to download the syllabus. Please try again later."

9.12 | Filter Syllabus (Student):

As a student, I want to view and download the syllabus for my academic year so that I can easily access the course details, learning objectives, and required chapters for all courses in that year.

Confirmation:

Success -

[a] **Redirecting to the Syllabus Filtering Interface:**
Upon logging in, the student can redirect to the syllabus filtering interface from the navigation bar.

[b] **Academic Year and Course Retrieval:** Based on the student's login information, the system automatically retrieves their academic year (e.g., 1st Year, 2nd Year, etc.) and presents a list of all courses associated with that year for selection.

[c] **Selecting Single or Multiple Courses:**

i. The student is shown a list of courses relevant to their academic year.

ii. He can select either a single course or multiple courses to view the syllabus (e.g., "CSE 403", "CSE 404").

[d] **Selecting Syllabus Portions to View:**

i. After selecting the courses, the student has the option to filter specific parts of the syllabus they wish to view, including:

A. Student Learning Outcomes

B. Recommended Books

C. Chapters

D. Course Credit

E. Contact Hours

F. Course Title

ii. TThe student selects one or multiple portions they want to review.

iii. **Fetching the Syllabus:**

A. After making the selections, the student clicks the "Fetch Syllabus" button.

B. The system retrieves and displays the syllabus for the selected courses and portions in either a consolidated or separate view.

iv. **Displaying the Filtered Syllabus:**

A. The filtered syllabus appears on the screen, showing all the requested details for the selected courses.

B. The student can view information like learning objectives, chapters, required readings, contact hours, and more, either for multiple courses or separately for each course.

v. **Downloading the Syllabus:**

A. The student is given the option to download the syllabus for the selected courses.

B. He/She can download either separate files for each course or a merged document containing the syllabus for all the selected courses.

Failure -

i. **Redirect Failure:**

Message: "Unable to redirect to the syllabus filtering interface. Please try again later."

ii. **Academic Year Retrieval Error:**

Message: "Failed to retrieve your academic year details. Please log in again or contact the administrator."

iii. **Course Selection Failure:**

Message: "No courses available for the selected academic year. Please verify your year or contact the administrator."

iv. **Syllabus Portion Selection Error:**

Message: "You must select at least one portion of the syllabus to proceed."

v. **Syllabus Fetch Failure:**

Message: "Failed to retrieve syllabus. Please check your selection and try again."

vi. **Display Failure:**

Message: "Unable to display the syllabus. Please try again later."

vii. **Download Failure:**

Message: "Failed to download the syllabus. Please try again later."

9.13 | View Academic Calendar

As a user, I want to view the academic calendar so that I can know about different scheduled academic activities.

Confirmation:

Success -

i. **Show Academic Calendar in Generalized View Mode:**
The system displays the academic calendar in a generalized view, covering all academic activities.

ii. **Show Academic Calendar According to a Specific Department:**
The user can view the academic calendar filtered for a specific department.

iii. **Show Academic Calendar Month Wise:**
The user can view the academic calendar organized by month.

iv. **Show Academic Calendar Week Wise:**
The user can view the academic calendar organized by week.

v. **Show All Vacations (Considering Different Time Range):**
The user can view all vacations within a specified time range.

vi. **Show All Academic Activities (Considering Different Time Range):**
The user can view all academic activities within a specified time range.

Failure -

i. **Failure to Show Academic Calendar in Generalized View Mode:**

Message: "Unable to load the academic calendar. Please refresh or try again later."

ii. **Failure to Show Department-Specific Academic Calendar:**

Message: "The academic calendar for the selected department couldn't be displayed. Please try again later."

iii. **Failure to Show Academic Calendar Month Wise:**

Message: "No data available for the selected month. Please check another month or try again later."

iv. **Failure to Show Academic Calendar Week Wise:**

Message: "Unable to retrieve the weekly academic calendar. Please try again later."

v. **Failure to Show All Vacations (Considering Different Time Range):**

Message: "Unable to load vacation data for the selected time range. Please adjust the range or try again later."

vi. **Failure to Show All Academic Activities (Considering Different Time Range):**

Message: "No academic activities found for the selected time range. Please refine your search or try again later."

9.14 | Update Class Representative Information (Administrator):

As an administrator, I want to update the class representative (CR) information for particular batches so that students and teachers can easily contact their CRs for updates or assistance.

Confirmation:

Success -

i. **Redirecting to the CR Update Interface:**

Upon logging in, the administrator can access the "Update Class Representative Information" option from the navigation bar.

ii. **Batch and Current CR Retrieval:**

The system automatically retrieves the list of batches (courses) assigned to the administrator based on their login.

It also displays the current class representative's information for each batch (e.g., name, contact number, email).

iii. **Selecting a Batch:**

The administrator selects the batch for which they want to update the class representative details from a list of their assigned batches.

iv. **Updating CR Information:**

The administrator is presented with fields to update or input the following information about the new class representative:

A. Name

B. Contact Number

C. Email Address

D. Student ID

E. Any additional notes(optional)

v. **Submitting the Updates:**

After filling in the updated information, the administrator clicks the "Submit" button to save the changes.

The system updates the class representative information for the selected course.

vi. **Confirmation of Success:**

A message confirming successful update appears: "Class Representative details have been successfully updated."

vii. **Notification to Class:**

The system optionally sends a notification or email to the entire class with the updated class representative information.

Failure -

i. **Redirect Failure:**

Message: "Unable to access the Class Representative Update interface. Please try again later."

ii. **Batch Retrieval Error:**

Message: "Failed to retrieve your batch(courses). Please log in again or contact the administrator."

iii. **CR Selection Failure:**

Message: "Unable to retrieve the current Class Representative information. Please try again later."

iv. **Incomplete Information Error:**

Message: "All fields must be filled out to update the Class Representative information."

v. **Update Failure:**

Message: "Failed to update Class Representative details. Please check your input and try again."

vi. **Notification Failure:**

Message: "Failed to send notification to the class. Please contact the administrator."

9.15 | View Class Representative Information (Student and Teacher):

As a student or teacher, I want to view the contact details of the class representative for my batch and courses so that I can easily reach out to them for assistance and updates.

Confirmation:

Success -

i. **Redirecting to the CR View Interface:**

Upon logging in, the student or teacher can access the "View Class Representative Information" option from the navigation bar.

ii. **Batch and CR Information Retrieval:**

The system automatically retrieves the list of batches and courses the student or teacher is associated with, based on their login information.

For each batch, the class representative's details (name, contact number, email) are displayed.

iii. **Selecting a Batch:**

The student or teacher selects a specific batch from the list to view the detailed class representative information for that batch.

iv. **Displaying CR Information:**

After selecting a batch, the class representative's information for that batch is displayed, including:

A. Name

B. Contact Number

C. Email Address

D. Office Hours or Availability (if applicable)

v. **Option to Download CR Information:**

The student or teacher is given the option to download the class representative's contact details in PDF or CSV format for easy reference.

vi. **Confirmation of Success:**

A confirmation message appears: "Class Representative information displayed successfully."

Failure -

i. **Redirect Failure:**

Message: "Unable to access the Class Representative Information interface. Please try again later."

ii. **Batch Retrieval Error:**

Message: "Failed to retrieve your batch/course. Please log in again or contact the administrator."

iii. **CR Information Retrieval Failure:**

Message: "Failed to retrieve Class Representative information for the selected batch. Please try again later."

iv. **Display Failure:**

Message: "Unable to display the Class Representative information. Please try again later."

v. **Download Failure:**

Message: "Failed to download the Class Representative details. Please try again later."

9.16 | Approve Rescheduling Class (Exam Committee):

As an representative of Exam Committee, I want to approve or reject class rescheduling requests so that I can manage the class schedule efficiently, and if a scheduling conflict arises, the system automatically proposes an alternative time.

Confirmation:

Success -

i. **Accessing Rescheduling Requests:**

Upon logging in, the administrator can access the rescheduling requests from the navigation menu under "Class Rescheduling."

ii. **Viewing Pending Requests:** The system displays a list of pending rescheduling requests. Each request includes details such as the original class time, requested new time, reason for rescheduling, and the affected class or course.

iii. **Reviewing Request Details:** The administrator can click on a specific request to view detailed information, including the current schedule and reason for rescheduling.

iv. **Automatic Schedule Adjustment:** If the requested new time conflicts with other classes, teacher availability, or room allocation, the system automatically generates a conflict-free alternative time

and updates the rescheduling request with this new time.

v. **Evaluating and Approving/Rejecting Requests:** The administrator reviews the automatically adjusted time proposed by the system. The administrator then decides to approve or reject the request by clicking the "Approve" or "Reject" button.

vi. **Notification of Decision:** Once a decision is made, the system automatically notifies the requester (e.g., the teacher or student) of the approval or rejection of their rescheduling request, including the automatically adjusted class time if applicable.

vii. **Updating the Class Schedule:** If approved, the class schedule is updated with the new time. The updated schedule is reflected in the system, and the changes are communicated to all relevant parties (e.g., students, teachers).

Failure -

i. **Access Failure:** Message: "Unable to access rescheduling requests. Please try again later."

ii. **Request Retrieval Error:** Message: "Failed to retrieve pending rescheduling requests. Please log in again or contact the system administrator."

iii. **Request Detail Display Issue:** Message: "Unable to display the details of the rescheduling request. Please try again later."

iv. **Automatic Schedule Generation Error:** Message: "Failed to generate an alternative class time. Please try again later."

v. **Approval/Reject Failure:** Message: "Unable to process the approval or rejection of the request. Please try again later."

vi. **Notification Failure:** Message: "Failed to notify the requester of the decision. Please check the notification system and try again."

vii. **Schedule Update Failure:** Message: "Unable to update the class schedule with the new time. Please contact the system administrator."

9.17 | View Personalized Dashboard

As a teacher/student/staff/superuser, I want to view a personalized dashboard so that I can easily access the information relevant to my role, such as my daily class schedule, any updates, and notifications related to my responsibilities within the system.

Confirmation:

Success -

i. **Logging in:**

Upon logging in with valid credentials, the system directs the user to their personalized dashboard.

ii. **Displaying Personalized Information:**

A. **Teacher:**

- Sees their assigned class schedule for the day.
- Notices any rescheduled or canceled classes.
- Receives updates about upcoming classes or any changes made by the superuser.
- Can view their preferred teaching slots or modify their preferences.
- Can view their profile and edit it.

B. **Student:**

- Sees their daily class schedule.

- Receives notifications about rescheduled or canceled classes.
- Can view their Profile.
- Views class representative information (name, contact details).

C. **Staff:**

- Accesses schedules of classes they are assigned to support (e.g., room availability, setup requirements).
- Receives notifications about room changes, canceled classes, or rescheduled sessions.
- Can view their profile.

D. **Superuser:**

- Sees an overview of department-wide schedules.
- Gets notified of pending reschedule requests.
- Can quickly access options to generate a routine or update existing schedules.

iii. Dynamic Schedule Updates:

The system dynamically updates the dashboard when there are changes to user roles, class schedules, room allocations, or rescheduling requests.

iv. Quick Access to Actions:

A. **Teacher:** Options to request class rescheduling.

B. **Superuser:** Buttons to generate a new routine, view requests, and assign teachers to courses.

C. **Staff:** Access to room schedules and class support assignments.

D. **Student:** A view of updated class schedules and the ability to check class representative details.

v. **Dashboard Layout:**

The layout adapts to each role's requirements:

- **Teachers** and **students** see a timetable.
- **Superuser** sees an overview with department-level scheduling tools.
- **Staff** sees room assignments and required setup details.

vi. **Access to Detailed Views:**

Users can click on specific days or sessions in their schedule to see more detailed information (e.g., class duration, room number, teacher, etc.).

Failure -

i. **Login Failure:**

Message: "Unable to log in. Please check your credentials and try again."

ii. **Dashboard Retrieval Error:**

Message: "Failed to load your dashboard. Please refresh the page or try again later."

iii. **Dashboard Access Failure:**

Message: "Unable to load the dashboard. Please check your connection or try again later."

iv. **Incomplete Dashboard Information:**

Message: "Some sections of the dashboard are unavailable. Please

contact the administrator."