



Software Requirements Specification

Mess Management System

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1. INTRODUCTION

1.1 Purpose

The purpose of the **Mess Management System** is to digitize and streamline the mess management process at GIKI. Currently, mess attendance, billing, and tracking rely on a manual register, leading to errors, inconsistencies, and inefficiencies in meal tracking and payments. Students have expressed challenges with tracking their mess-in/mess-out status, billing calculations, and payment methods.

This software will introduce an automated system where students can mess in/out digitally, track their attendance history, view their meal and billing records, and make online payments. It will ensure accuracy, reduce human error, enhance transparency, and improve the overall experience for students.

1.2 System Scope

- **Mess In/Out System:** The system will provide a digital platform for students to check in and out of the mess, eliminating the need for manual registers and ensuring real-time updates.
- **Attendance and Meal Tracking:** Meal attendance will be recorded automatically based on mess-in/mess-out rules, ensuring accurate tracking and reducing manual errors.
- **Billing and Payment:** The system will calculate mess dues in real-time, allowing students to view bills, make online payments, and access billing history easily.
- **Notifications and Alerts:** Students will receive automated reminders for mess-in deadlines, mealtimes, and pending payments to improve awareness and convenience.
- **Feedback and Complaints:** A complaint system will allow students to report issues related to meal quality, service, or billing, with an option for anonymous submissions.
- **User Roles and Access:** Students can manage attendance and payments, mess staff can update records, and administrators will oversee system operations and reporting.
- **Security and Data Protection:** The system will integrate with GIKI's database, implement role-based access, and maintain audit logs to ensure security and prevent unauthorized changes.

1.3 Stakeholders Involved

Stakeholders for the **Mess Management System** are:

- **Students:** Primary users who will mess in/out, track attendance, view bills, and make payments.
- **Mess Staff:** Responsible for checking attendance, managing meal records, and handling complaints.

- **Mess Supervisor:** Oversees mess operations, ensures accurate billing, track attendance record and mess expenses.
- **University Administration:** Ensures compliance, manages financial aspects, and monitors overall system efficiency.
- **IT Support Team:** Maintains the system, fixes technical issues, and ensures data security.
- **Finance Department:** Handles student payments, reconciles mess bills, and ensures accurate financial reporting.
- **Mess Accountant:** Manages mess-related financial records, calculates total expenses, and ensures proper budget allocation.
- **Cook:** Provides daily cost estimates for food preparation and ensures that meals are prepared within the allocated budget.

These stakeholders play a crucial role in ensuring the system operates efficiently and meets the needs of all users.

2. REQUIREMENT GATHERING PLAN

2.1 Selected Techniques

To ensure a comprehensive understanding of the system's requirements, multiple techniques were used for requirement gathering. These techniques included **interviews, surveys (Google Forms), observations (ethnography), focus group discussions, and document analysis**. Each method provided valuable insights from different perspectives, allowing us to collect both qualitative and quantitative data.

- **Interviews:** One-on-one discussions were conducted with key stakeholders, such as mess staff, cooks, waiters, the mess supervisor, and the accountant. This helped us gain a deeper understanding of their needs, expectations, and challenges related to the mess system. For example, interviewing the mess supervisor provided insights into how inventory and meal planning are managed.
- **Surveys (Google Forms):** A structured online questionnaire was distributed among students to collect their feedback on the mess system. This method was useful as we gathered data from many students efficiently.
- **Observations (Ethnography):** As students, we actively observed the mess operations by immersing ourselves in its daily workflow. This technique helped us understand real-world inefficiencies and challenges, such as delays in food serving or issues with meal distribution. Observations provide **practical insights into existing processes**, but they can be **time-consuming** and require careful interpretation.

- **Focus Group Discussions:** Group sessions were conducted with students, mess staff, and supervisors to discuss potential improvements in the mess system. These discussions allowed participants to share their perspectives, suggest solutions, and collaboratively explore ideas.
- **Document Analysis:** We reviewed existing records, such as mess policies, student feedback reports, and meal plans, helped us extract important requirements. We also analyzed Mess Management Software of FAST University as suggested by one of our respondents that gave us deeper understanding of functional and non-functional requirements of the Mess Management System.

Requirement gathering plan is crucial as it lays the foundation for a successful project. It ensures **clear understanding of user needs**, reducing misunderstandings and costly rework. Well-defined requirements **prevent scope creep**, improve software quality, and enhance stakeholder satisfaction. It also supports **accurate planning**, helping to estimate resources, timelines, and risks effectively. Without proper requirements, projects face delays, budget overruns, and failure.

2.2 Questions Asked

The following questions were asked from students and mess staff.

Questions Asked from Students (via Google Form)

1. How do you find the current register-based mess in/out system?
2. Have you ever faced errors in mess attendance due to the manual register system?
3. Would you prefer a Software System to mark your mess in/out and bill payment digitally?
4. How often do you forget to mess before leaving for an extended period?
5. What payment methods would you prefer for mess fees?
6. Would you find it useful to view your mess history and billing details online?
7. Would you prefer to mark attendance via Manual Register, ID card Scanning, Biometric, or App/Website?
8. Have you ever faced billing issues due to incorrect mess records?
9. What features would improve your overall mess experience?
10. What features would you like in the Central Mess Management System Software?
11. Do you think an online system would improve mess-in/mess-out accuracy and billing procedure? Give you insights as well.

Questions Asked from Mess Management Staff (via Open Interviews)

1. How do you currently track **mess-in and mess-out entries**?

2. What are the **challenges** you face with the **manual mess system**?
3. How do you **verify attendance** and prevent errors in meal tracking?
4. How do you **handle billing** and overdue bills?
5. Would you prefer a **digital system** to automate attendance and billing?
6. How do you **calculate mess expenses** and manage payments?
7. How does the **cook estimate daily food costs**, and how can the system assist in this process?
8. How do you handle **complaints regarding food, service, or billing**?
9. Would a **feedback and complaint system** help address student concerns efficiently?
10. Would you like a system that generates **automated reports on student attendance and finances**?
11. How do you manage **inventory and food** in the mess?
12. What other **functionalities** would improve mess operations for staff and management?

2.3 Stakeholders Consulted

1. Amir-ul-Haq: Mess Accountant
2. Naveed: Mess Cook
3. Zubair: Mess Cook
4. Adil Shah: Mess Waiter
5. Hamza: Mess Waiter
6. Ahmed Nawaz: Mess Supervisor
7. Students: Responses from approximately 50 students were recorded via Google Form.

3. COLLECTED RESPONSES & FINDINGS

3.1 Problems Identified

1. Mess In/Out and Attendance Tracking Issues

- The current system relies on **manual registers**, leading to frequent **errors and inconsistencies** in mess-in/mess-out tracking.
- Students sometimes forget to **mess out**, causing incorrect billing and disputes.
- Mess staff manually verify student attendance, which is **time-consuming and prone to mistakes**.
- There is **no real-time system** for students to check their attendance history.

2. Billing and Payment Challenges

- The **mess accountant manually calculates** student bills at the end of each month, making the process difficult and inefficient.
- There is **no automatic tracking** of meals, making billing prone to **human error**.
- Payments are handled **manually**, requiring students to visit the office or bank, which is inconvenient.
- Students want **online payment options** for convenience.

3. Notifications and Alerts

- There are **no automated reminders** for students to mess in or mess out before the **required time**, leading to missed meal entries.
- Students do not receive **alerts for pending payments**, increasing the risk of late fees.
- Meal menu updates are not communicated effectively, and students prefer **real-time notifications** about what's being served.

4. Feedback and Complaint System

- Currently, students have **no structured way** to submit feedback or complaints about food quality, service, or billing errors.
- Some students requested an **anonymous complaint system** to report hygiene and service issues without fear of backlash.
- Mess staff **manually handles complaints**, which **delays resolution** and creates communication gaps.

5. Mess Staff and Management Difficulties

- Mess staff struggle to **track attendance manually**, especially when students forget to mess out.
- The **cook estimates daily food costs manually**, which can lead to budgeting inefficiencies.
- Staff often face **shortages of food items**, and students have to request missing items frequently.
- There is **no system-generated reporting** for mess staff to analyze food consumption trends and meal demands.

6. Security and Access Control Issues

- The **manual register can be manipulated**, leading to fraudulent attendance markings.
- There is **no proper role-based access** to manage student records securely.

- A **digital system linked to GIKI's database** is required to prevent unauthorized access and ensure data accuracy.

3.2 Key Findings

1. Students Want a Digital System:

- Majority of students prefer an **automated mess-in/mess-out system** over the manual register.
- Many students expressed the need for **attendance tracking** and **bill history access**.

2. Billing & Payment Must Be Automated:

- Students prefer **real-time billing calculations** instead of waiting for monthly manual bill generation.
- **Online payment options** are a common request.

3. Notifications & Reminders Are Essential:

- Students expect **automated reminders** before the **mess in/out deadline** to avoid missed meals.
- Bill due reminders should be sent to **prevent late fines**.

4. Mess Supervisor & Accountant Need an Automated System:

- The **mess accountant struggles** with manually recording attendance and generating bills.
- An **automated system would reduce workload** and improve billing accuracy.

5. Students Want Better Meal Management:

- Some students want **customizable meal options** based on dietary preferences.

6. A Feedback & Complaint System is Needed:

- Students want a **structured way to submit complaints and feedback**.
- There is strong demand for an **anonymous complaint feature** for hygiene and service concerns.

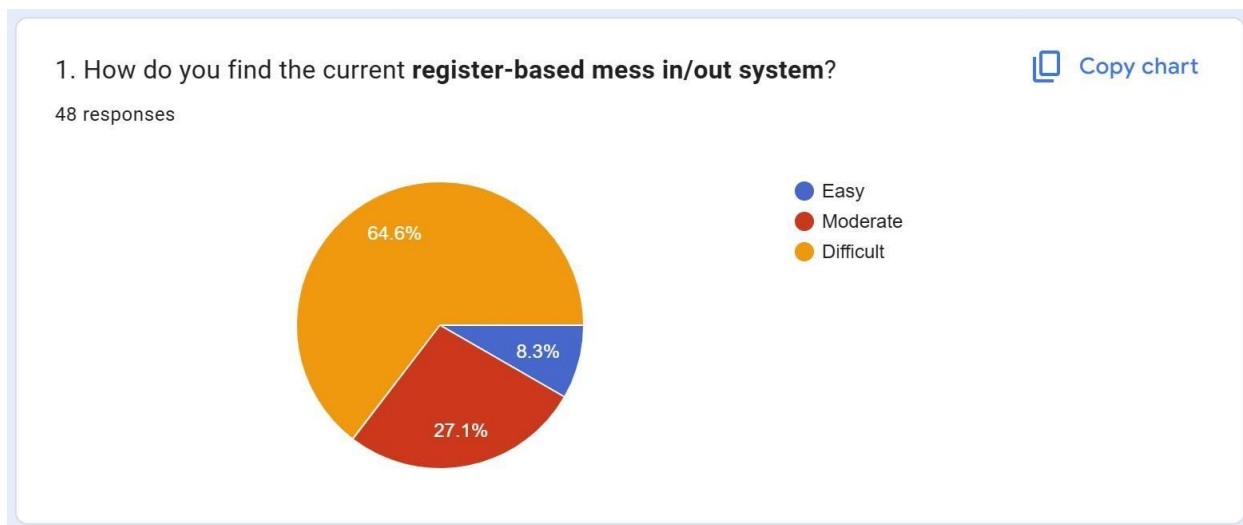
7. Security & Accuracy Are Important:

- **Biometric authentication: ID Card Scanning, Facial Recognition or Biometric Verification** is preferred to prevent **proxy attendance**.
- The system should be integrated with **GIKI's student database** for **secure access control**.

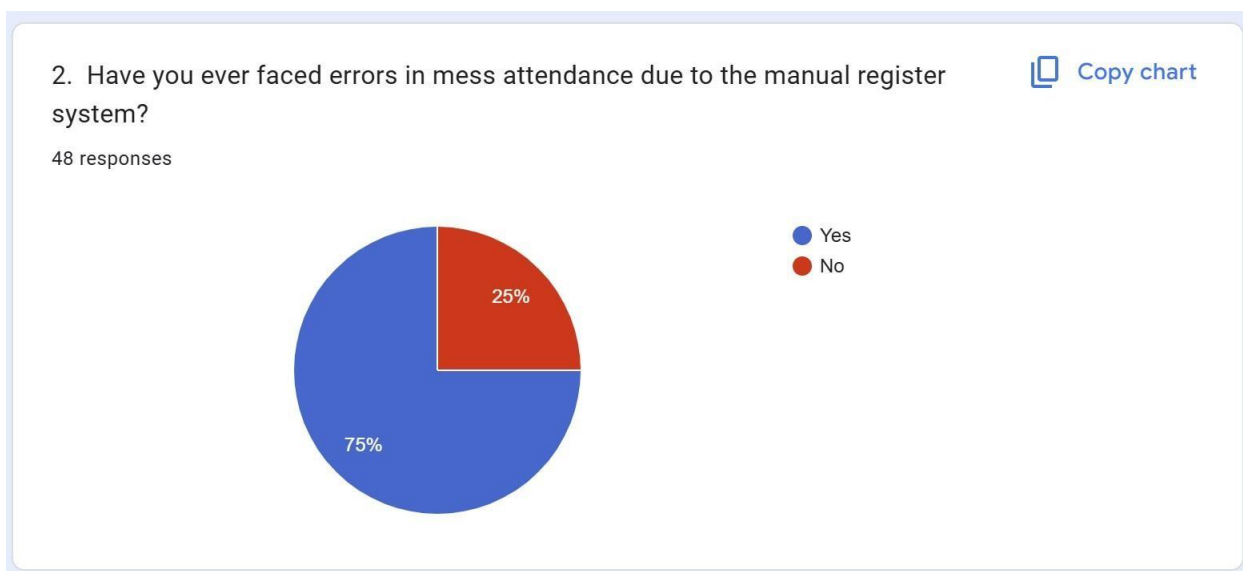
3.3 Summarized Results

From the summarized results of the responses, the following facts were established

1. The pie chart below shows that **64%** of students find the current register-based mess in/out system difficult.



2. The pie chart below shows that **75%** of students have faced errors in mess attendance due to the manual register system.

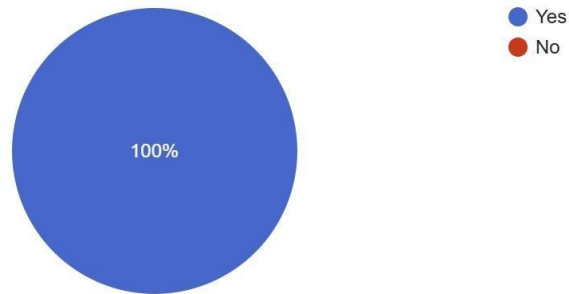


3. The pie chart below shows that **100%** of students would prefer a software system for mess.

3. Would you prefer a **Software System** to mark your mess in/out and bill payment digitally?

 Copy chart

48 responses

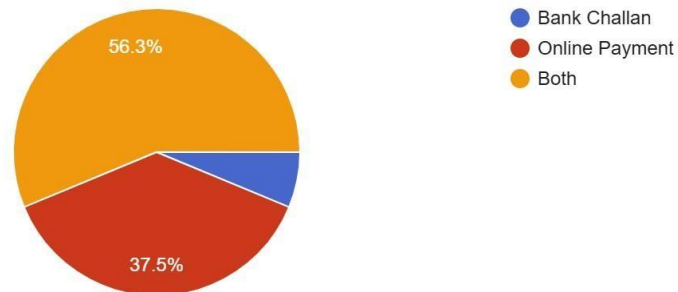


4. The pie chart below shows that **56%** of students would prefer a software system that supports an integrated online payment along with manual bank challan.

5. What **payment methods** would you prefer for mess fees?

 Copy chart

48 responses

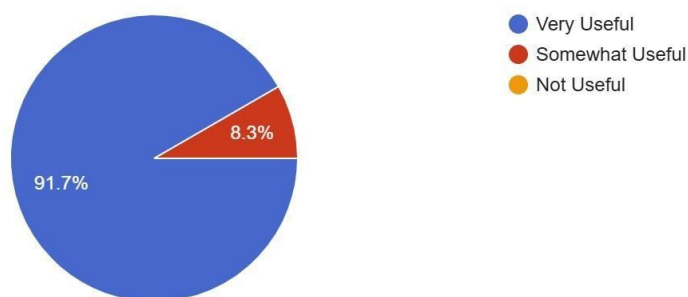


5. The pie chart below shows that **91%** of students would find it useful to view their mess history and billing details.

6. Would you find it useful to **view your mess history and billing details** online?

 [Copy chart](#)

48 responses

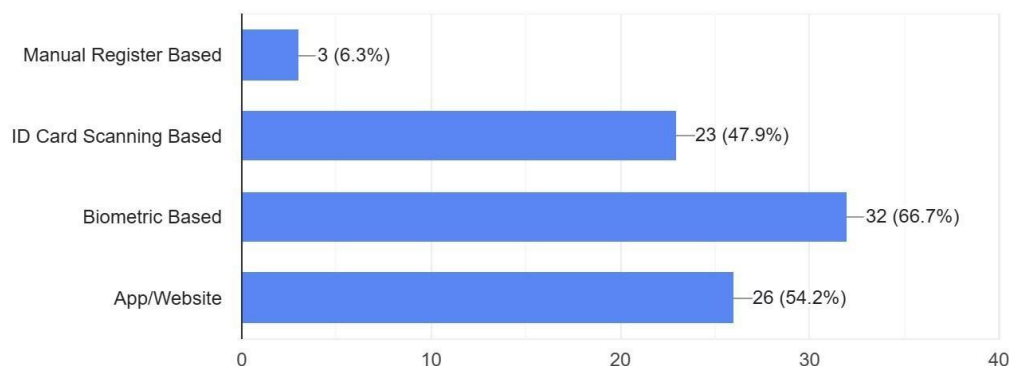


6. The bar graph below shows that only **3%** of students are okay with the manual registerbased attendance system while the rest **97%** prefer **ID card scanning, biometric or app/website** for attendance.

7. Would you prefer to mark attendance via **Manual Register, ID card Scanning, Biometric, or App/Website**?

 [Copy chart](#)

48 responses



4. FUNCTIONAL REQUIREMENTS

4.1 Mess Attendance & Tracking

Requirement ID	REQ-001	Requirement Type	Functional
Requirement	Mess Attendance & Tracking		
Description	The system must automatically track student mess in/mess out status.		
Rationale	Ensures accurate meal tracking and prevents unauthorized usage.		
Source	Survey Feedback		
Fit Criteria	The system successfully logs in attendance for each meal entry.		

4.2 Attendance Summary View

Requirement ID	REQ-002	Requirement Type	Functional
Requirement	Attendance Summary View		
Description	The system should allow students to check their meal attendance history.		
Rationale	Help students track their meal usage and billing transparency.		
Source	Survey Feedback		
Fit Criteria	Students can view their attendance within the system.		

4.3 Automatic Bill Generation

Requirement ID	REQ-003	Requirement Type	Functional
Requirement	Automatic Bill Generation		
Description	The system must generate monthly bills based on student attendance records.		
Rationale	Ensure accurate billing without manual efforts.		
Source	Mess Accountant		
Fit Criteria	The system calculates and displays monthly bill correctly.		

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.4 Fine Handling

Requirement ID	REQ-004	Requirement Type	Functional
Requirement	Fine Handling		
Description	The system should allow the mess accountant to add fines (if any) before finalizing the bill.		
Rationale	Provides flexibility for penalty adjustments.		
Source	Mess Accountant		
Fit Criteria	Fines can be applied and reflected in the final bill.		

4.5 Online Payment Integration

Requirement ID	REQ-005	Requirement Type	Functional
Requirement	Online Payment Integration		
Description	The system should support online payments as well as bank transfers.		
Rationale	Provides convenience and flexibility in payment options.		
Source	Survey Feedback		
Fit Criteria	Students can successfully pay their bills using online methods.		

4.6 Meal Cutoff Alerts

Requirement ID	REQ-006	Requirement Type	Functional
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Requirement	Meal Cutoff Alerts
Description	The system should notify students before the mess-in / mess-out deadline.
Rationale	Ensure students do not miss meals due to forgetfulness.
Source	Mess Administration
Fit Criteria	Students receive timely notifications for meal deadlines.

.7 Bill Due Reminders

Requirement ID	REQ-007	Requirement Type	Functional
Requirement	Bill Due Reminders		
Description	The system must send reminders for pending payments to students.		
Rationale	Reduces late payments and ensures timely settlements.		
Source	Mess Administration		
Fit Criteria	Students receive reminders before due dates.		

4.8 Feedback System

Requirement ID	REQ-008	Requirement Type	Functional
Requirement	Feedback System		
Description	The system should allow students to submit feedback on food and services.		

4

Rationale	Helps improve food quality and service efficiency.
Source	Survey Feedback
Fit Criteria	Students can submit feedback through the system.

4.9 Cost Calculation

Requirement ID	REQ-009	Requirement Type	Functional
Requirement	Cost Calculation		
Description	The system must help the cook estimate daily meal costs based on the number of students.		
Rationale	Ensures efficient budgeting and meal planning.		
Source	Survey Feedback		
Fit Criteria	The system correctly calculates estimated meal costs.		

.10 Biometric Authentication for Attendance

Requirement ID	REQ-010	Requirement Type	Functional
Requirement	Biometric Authentication for Attendance		

4

Description	The system should use biometric verification (fingerprint or RFID) for meal attendance.
Rationale	Ensures security and prevents proxy attendance.
Source	Mess Administration
Fit Criteria	Attendance is only logged when biometric authentication is successful.

The above-listed **functional requirements** listed are also the **user expectations** from the mess management system.

5. USER STORIES

5.1 Mess Attendance & Tracking

- **As a student**, I want my meal attendance to be recorded automatically so that I don't have to manually check-in.
- **As a mess administrator**, I want to track students' mess in/out status so that unauthorized usage can be prevented.

5.2 Attendance Summary View

- **As a student**, I want to see my meal attendance history so that I can track my meal usage and billing.

5.3 Automatic Bill Generation

- **As a student**, I want my monthly bill to be generated automatically based on my meal attendance so that I don't have to calculate it manually.

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- **As a mess accountant,** I want the system to calculate student bills automatically so that billing errors are minimized.

5.4 Fine Handling

- **As a mess accountant,** I want to apply fines to student bills so that penalties for missed payments or rule violations can be enforced.

- **As a student,** I want to see any fines applied to my bill so that I understand the reason for additional charges.

5.5 Online Payment Integration

- **As a student,** I want to pay my mess bill online using online money transfer apps or bank transfers so that I can make payments conveniently.
- **As a mess administrator,** I want to verify online payments so that transactions are recorded properly.

5.6 Meals Cutoff Alert

- **As a student,** I want to receive a reminder before the meal booking deadline so that I don't miss my meal.

5.7 Bill Due Remainder

- **As a student,** I want to receive reminders for pending payments so that I can pay on time and avoid fines.
- **As a mess accountant,** I want to track unpaid bills so that I can follow up with students who have outstanding payments.

5.8 Feedback System

- **As a student,** I want to submit feedback about the food quality and service so that improvements can be made.
- **As a mess administrator,** I want to review student feedback so that necessary changes can be implemented.

5.9 Meal Count Forecasting

- **As a mess administrator,** I want the system to predict daily meal demand based on attendance patterns so that food wastage can be minimized.
- **As a cook,** I want to use the meal forecast so that I can prepare the right amount of food.

5.10 Cost Calculation

- **As a cook,** I want to estimate daily meal costs based on the number of students so that I can plan the budget efficiently.
- **As a mess accountant,** I want accurate meal cost calculations so that financial records remain correct.

5.11 Biometric Authentication for Attendance

- **As a student**, I want to check-in using biometric authentication so that my attendance is accurately recorded.
- **As a mess administrator**, I want to ensure that attendance is taken only when students authenticate biometrically so that proxy attendance is prevented.

6. NON-FUNCTIONAL REQUIREMENTS

6.1 Security & Data Privacy

The system must ensure secure storage and transmission of biometric data, payment details, and attendance records. Encryption (AES-256), role-based access control (RBAC), and secure authentication methods (e.g., OTP, biometric verification) should be implemented to prevent unauthorized access.

6.2 Performance & Response Time

All critical operations, such as meal booking, payment processing, and attendance marking, should be completed in under **2 seconds** to ensure a seamless user experience. The system should efficiently handle multiple simultaneous requests without slowdowns.

6.3 Scalability & Future Growth

The system should support a growing number of users without affecting performance. It should be designed to scale horizontally (adding more servers) or vertically (upgrading existing hardware) to accommodate increased traffic and data volume.

6.4 System Reliability & Uptime

The system should be operational **24/7**, with an uptime of at least **99.9%**. Automatic failover mechanisms should be placed to handle unexpected server failures, ensuring uninterrupted service for attendance tracking and bill payment.

6.5 Usability & User Experience

The interface should be simple, intuitive, and accessible on **both mobile and desktop** devices. Users should be able to complete tasks (meal booking, payment, attendance marking) with minimal effort, ensuring a smooth and frustration-free experience.

6.6 Compliance & Data Protection

The system must comply with **local data protection regulations**. Personal and financial data should be handled responsibly, with proper consent mechanisms in place to protect user privacy.

The above-listed **non-functional requirements** can also be considered as the mess management system and **constraints**.

7. CONCLUSION

The **Mess Management System** aims to address the inefficiencies in traditional mess operations by automating meal management, attendance tracking, billing, and feedback handling. Key challenges identified, such as manual errors in billing & attendance, lack of meal customization, food wastage, and inefficient complaint resolution, highlight the need for a digital transformation in mess operations.

By implementing a centralized and user-friendly system, students can pre-book meals, track expenses, and provide feedback seamlessly, while mess administrators benefit from automated inventory management, transparent billing, and data-driven decision-making. This system will not only enhance student satisfaction but also reduce operational costs, minimize food waste, and improve overall mess efficiency.

Ultimately, the Mess Management System serves as a scalable, efficient, and transparent solution that streamlines mess operations, ensuring a better dining experience for all stakeholders.