



# EFFICIENT MESS MANAGEMENT SYSTEM

GROUP - 10

HS202  
**HUMAN GEOGRAPHY &  
SOCIETAL NEEDS**

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# **CERTIFICATE**

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This is to certify that the B. Tech project titled "Efficient Mess Management System"

Prepared by:

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is approved for submission for the course on Human Geography and Societal Needs in the Department of Humanities and Social Sciences, Indian Institute of Technology Ropar.

Signature of Examiner and Guide/s

Dr Kamal Kumar Choudhary  
Department of Humanities and Social Sciences  
IIT Ropar

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# **DECLARATION**

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I hereby declare that the report entitled "Efficient Mess Management System" submitted by us, for the partial fulfillment of the course on Human Geography and Societal Needs (HS 202) in the second year of the B. Tech programme in IIT, Ropar. The work carried out by us under the supervision of Dr. Kamal Kumar Choudhary, Department of Humanities and Social Sciences. We further declare that this written submission represents our ideas and other's ideas or words have been included. We also have adequately cited and referenced the original sources in the case of other's ideas or words. We have not misrepresented any idea/data/fact/source to the best of our knowledge. Therefore, we affirm that our group has adhered to all principles of academic honesty and integrity.

Place: Ropar

Date: 20/04/2025

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# ACKNOWLEDGEMENT

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We sincerely thank **Ms. Shalu**, our TA, for her constant support throughout this project. We're also grateful to mess managers **Mr. Abhishek Chauhan**, **Mr. Anuj Kumar**, and **Mr. Pawan** for sharing valuable insights into mess operations. Special thanks to **Mr. Omm Shree**, **Mr. Saksham Bansal**, and **Mr. Aditya Sahu** for helping us understand the administrative challenges and offering key inputs. Lastly, we're especially thankful to **Dr. Kamal Kumar Choudhary** for giving us the opportunity to work on this project and supporting a solution that can benefit not just IIT Ropar, but students across the country.

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## ABSTRACT

The Smart Mess Management System is a scalable online system designed to address mess operations and enhance the experience of students on campus, with the first implementation at IIT Ropar. The system has been developed in collaboration with mess managers, student representatives, and administrative staff, with the aim of addressing key issues like food wastage, rebate management, and lack of real-time communication between students and the mess personnel.

Key features include pre-ordering of meals, late plate availability, digital feedback, nutritional dashboards, and auto-rebate processing. The system also supports special item bookings, UPI payments integrated, and live inventory tracking to increase efficiency and reduce overhead for mess staff.

Apart from operational advantages, the platform encourages sustainability through AI-driven quantity forecasting, expiry reminders, and facilitation of redistributing excess food. It also encourages inclusivity through enabling students to mention dietary preferences and allergies.

With its student-focused design, data-driven model, and sustainability focus, the Smart Mess Management System is intended to revolutionize campus dining and is designed to scale to institutions across the country.

## PROBLEM STATEMENT

Effective mess management is a perennial issue in all Indian educational institutions. Although it is essential for student well-being, current mess systems are plagued by food wastage, lack of transparency, and limited student involvement in decision-making. In IIT Ropar, all these factors are extremely dominant, with wasteful practices and limited data utilization leading to unnecessary operational inefficiency as well as compromised service quality.

A questionnaire of more than 50 students identified significant areas of pain. On average, 19% of the food prepared daily is wasted, and the top wasted foods are rice (23%), vegetables (18%), and chapatis (15%). Not only do these losses put pressure on mess budgets but also lead to unnecessary wastage in the environment.

Service quality is also of prime importance. 61% of students referred to high day-to-day variability in food quality, and their complaints ranged from cold food (42%), variable taste (39%), to extremely oily and unhealthy food (21%). Further, communication failure between the mess staff and students contribute to these problems—72% of students did not know of any feedback system, and 85% had never participated in menu planning.

Operational inefficiencies also limit the flexibility of the mess. While 68% of the students are keen on a meal pre-booking facility, there is no such facility available now. This absence of facility presents a vast potential for preventing overproduction and improving the match of food preparation with demand.

The Smart Mess Management System has been created to address these pressing issues by integrating data-driven planning, real-time feedback loops, and student needs-inspired design into campus dining operations. Its goals are to significantly reduce food waste, increase meal satisfaction, and streamline the administrative load—while promoting sustainability and inclusivity.



**Average amount of food wasted per meal**



# ORIGIN

## AND IDENTIFICATION OF THE PROBLEM

### PROBLEM IDENTIFICATION

This project idea stemmed from growing student dissatisfaction with the current mess system at IIT Ropar. A survey revealed major concerns about food quality, hygiene, variety, and service. Many students called for change, highlighting the need for a more transparent and student-focused mess management system.

Good quality food is essential for students' physical health, mental focus, and overall well-being. Nutritious, clean, and tasty meals boost energy, improve concentration, and reduce stress, helping students perform better academically and thrive in campus life.

The mess manager shared key issues with the current system, mainly food wastage caused by inaccurate predictions of daily student attendance. Without proper tracking, meals are often over-prepared. He also highlighted challenges in collecting feedback and managing preferences. These points stress the need for a data-driven system to reduce waste and improve operations.

Manager Insights



IMPACT ON STUDENTS LIFE

# Students Side Issues

Food Quality  
(Covers: Quality of food, Quality of items used)

Menu Variety  
(Covers: Menu)

Hygiene Standards  
(Covers: Hygiene)

## Key Operational Challenges

Payment System  
(Covers: Mess payment structure)

Time Management  
(Covers: Timing, Rush hours, no space)

Portion Control  
(Covers: Quantity, Food management)

# Mess Side Issues

Price Uncertainty  
(Changing price of inputs)

Student Variability  
(Covers: No fixed amount of students)

Food Waste  
(Covers: Wastage of foods)

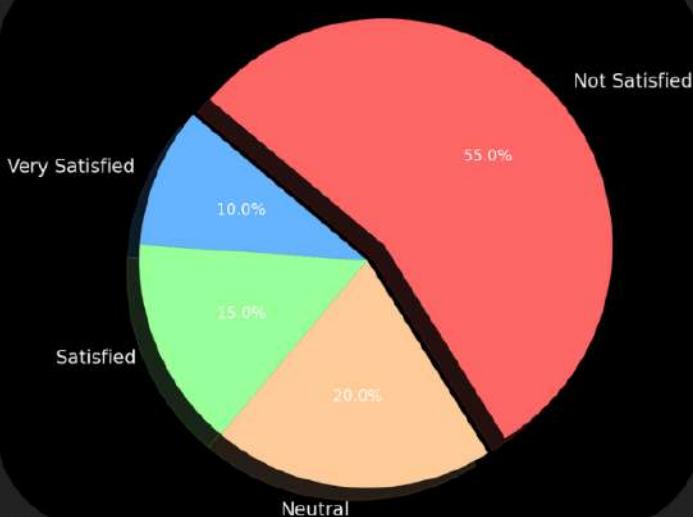
## Key Operational Challenges

System Structure  
(Covers: Plates system)

Market Competition  
(Covers: Competition)

Income Stability  
(Covers: Workers' income)

Student Satisfaction with Mess Food



## Analysis of Student Mess Satisfaction

The pie chart shows student satisfaction with mess food at IIT Ropar. A majority (55%) are not satisfied, while 20% feel neutral. Only 15% are satisfied, and 10% are very satisfied. This indicates a strong need for improvement in the current mess services to meet student expectations.

Many Indian institutes have modernized their mess systems using digital tools like QR codes, feedback forms, and ERP payments to cut wastage and improve planning.

At IIT Ropar, however, progress has stalled at the discussion stage. Despite proposals, manual attendance and word-of-mouth complaints remain the norm.

This gap between ideas and action has led to student dissatisfaction and operational issues for staff. A centralized digital system is essential to improve service quality, reduce costs, and streamline mess operations.

### **Student-Side Solutions:**

- Feedback forms exist but rarely lead to change.
- Complaints to mess reps are informal and often ignored.
- Some students avoid mess food and eat at the canteen, which is costlier and not always better. There's also no real-time platform for direct communication with mess staff.

### **Vendor-Side Solutions:**

- Menu changes happen without informing students, causing dissatisfaction.
- Food quality has visibly declined with no accountability.
- Student feedback is rarely acknowledged or acted upon.
- No system exists to monitor vendor performance based on student input.

These issues highlight the urgent need for a more transparent and student-oriented mess management system.



# DETAILED DESCRIPTION OF THE IDENTIFIED PROBLEM

The mess facility at IIT Ropar, like many Indian institutions, faces systemic issues impacting efficiency and student satisfaction, stemming from outdated practices and lack of digitization. Our project aims to address these shortcomings by implementing a data-driven mess management system, with potential for nationwide scalability.

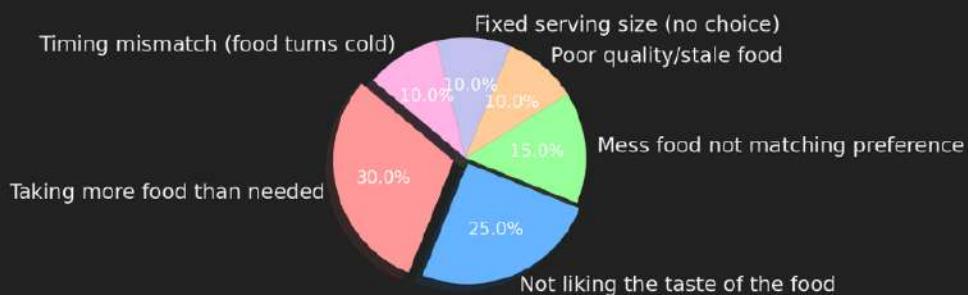
## Key Issues Identified

### High Food Wastage

One of the most pressing concerns is the large amount of food that is daily wasted. Based on direct observation and mess records, approximately 23–28% of food prepared each day is discarded. Results of our survey also highlight this issue:

- **Rice dishes:** 23% wastage
- **Vegetable preparations:** 18% wastage
- **Bread products (e.g., chapatis):** 15% wastage

This not only results in financial loss for the mess administration but also contradicts principles of sustainability and responsible resource use.

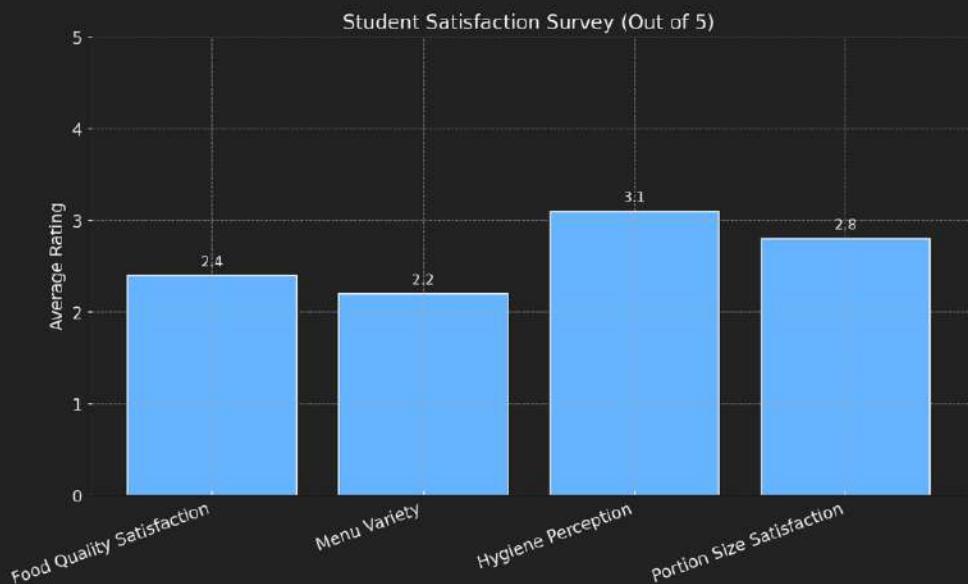


Pie Chart explaining the reasons of Food Wastage in the mess

## **Student Dissatisfaction**

Our survey, which gathered responses from 50 students, reveals deep dissatisfaction with the current mess system:

- **Food Quality Satisfaction:** 2.4 / 5
- **Menu Variety:** 2.2 / 5
- **Hygiene Perception:** 3.1 / 5
- **Portion Size Satisfaction:** 2.8 / 5
- **Support for Digital Management System:** 78% voted in favour



Qualitative responses highlighted issues like cold meals, repeated dishes, dirty utensils, and long wait times, leading to increased meal skipping and further wastage.

## **Service Quality**

A staggering 61% of students reported inconsistency in food quality on a day-to-day basis. The top complaints include:

- **Cold or lukewarm meals:** 42%
- **Inconsistent taste:** 39%
- **Extremely oily food:** 68%

Such inconsistencies not only diminish the overall dining experience but also foster mistrust in the mess system's reliability and effort.

## **Operational Inefficiencies**

The mess management system faces key inefficiencies that impact service quality and student satisfaction:

- No data-driven approach to meal planning, inventory, or staffing.
- Manual inventory management causes problems like overstocking and understocking.
- Poor communication between management and students.
- Lack of coordination among staff during peak hours.

These issues lower trust and reliability in the system.

## **Lack of Feedback & Student Involvement**

Another significant shortcoming is the absence of structured feedback mechanisms. Our survey found that a majority of students were unaware of any existing way to give feedback as well as that they were never contacted during menu planning. This gap between students and the mess leads to repeated mistakes and no way to share feedback.

### **Administrative Problems**

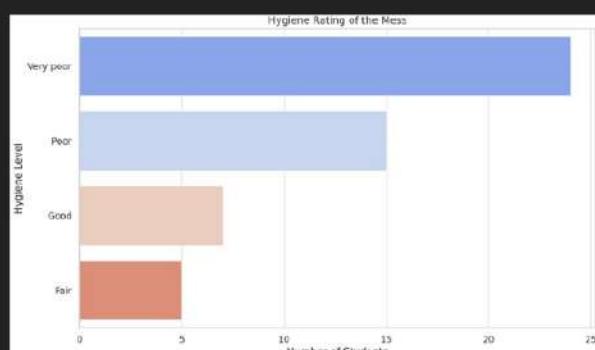
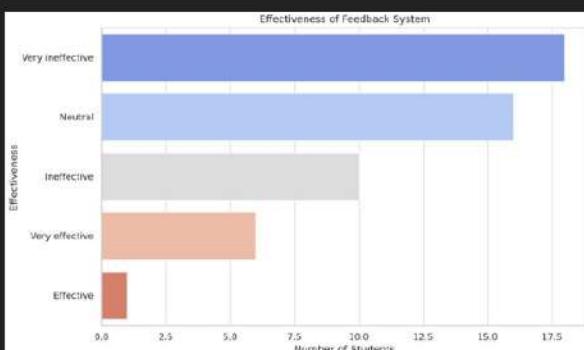
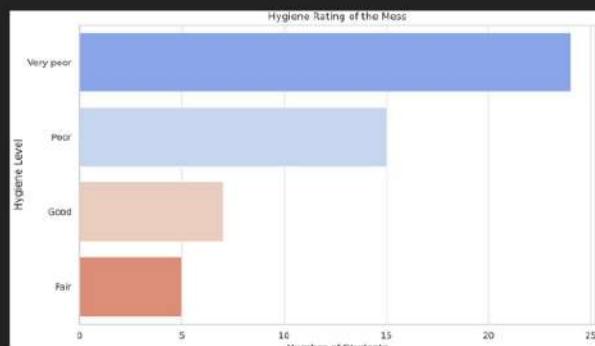
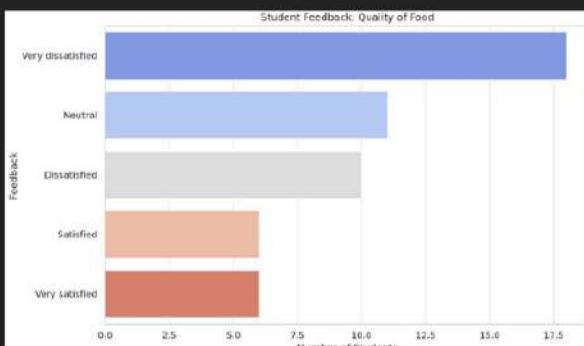
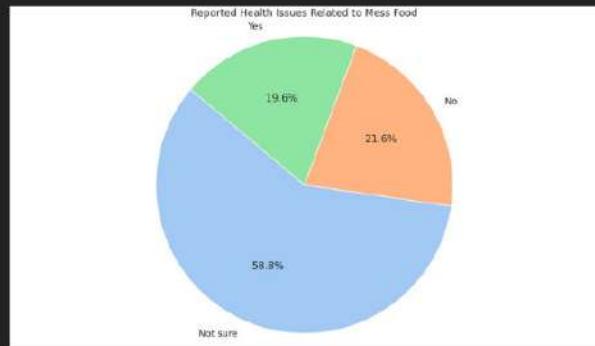
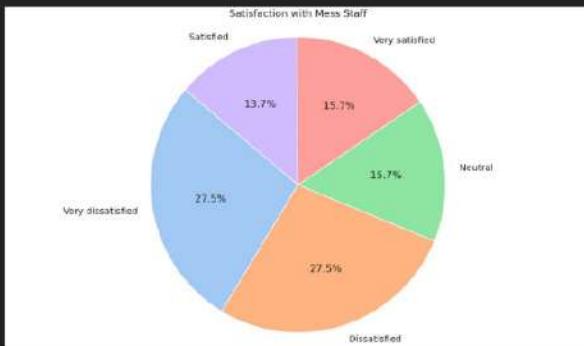
The administrative staff of the mess face several challenges that hinder smooth operations:

- Manual rebate tracking during student absences is error-prone and time-consuming.
- Lack of immediate data on meal portions leads to guesswork in food preparation.
- Payment and receipt management issues, especially for skipped meals or plan changes.
- Reliance on pen-paper systems despite a digitally connected campus.

Mess managers also lack tools to track consumption patterns, monitor food wastage, and forecast demand during events or peak seasons.

# SURVEY INSIGHTS

## Insights from Six Key Graphs Highlighting Student Mess Experience



We had a discussion with the mess manager to understand ongoing issues, gather insights on operations, and explore possibilities for implementing a better management system.

# CURRENT DEVELOPMENTS IN THE IDENTIFIED PROBLEM

In recent years, many Indian institutions have upgraded their mess systems using technology like attendance tracking, feedback forms, and ERP-integrated payments to reduce food wastage and improve student satisfaction.

At IIT Ropar, however, progress has mostly stayed in the discussion phase. While app proposals and meal booking systems have been suggested, no proper solutions have been implemented. Attendance is still paper-based, and complaints are handled informally.

This gap between ideas and action has led to frustration among students and mess staff. Irregular attendance, poor inventory management, and slow feedback are common, and without a centralized digital system, service quality and costs are impacted, highlighting the need for an integrated mess management solution.



## Current Mess Feedback System

The current mess feedback system lacks transparency and accountability, with no way to verify if complaints are seen or addressed by the vendor. This makes it hard for students to trust the system or know if their concerns about food quality are being addressed.

## **Current Mess Rebate System**

The current rebate system is inefficient, relying on form filling, which makes it slow and cumbersome for students. A more straightforward, transparent, and student-friendly system is needed for faster resolution and better communication.



## **Current Mess Pest Control System**

Pest control in the mess is inadequate, with ineffective machines using light to lure bugs. Additionally, these machines are placed too close to the eating area, causing hygiene issues and discomfort for students.

## **Current number of mess officials**

The mess has a very low ratio of officials to students, making it difficult to manage operations efficiently. This shortage leads to delays in addressing student concerns related to food quality and hygiene, further impacting overall service quality.

ANUSHA HOSPITALITY SERVICES PVT. LTD. MESS COMMITTEE MEMBERS NAME & CONTACT NUMBER		
SR. NO.	NAME	MOB. NO.
1	SAKSHAM DANSAL	7082682902
2	LAKAVATH ASHISH SAI	7382252042
3	BHUMIKA CHAUDHARI	7020739258
4	OMVIR SHRIKE	8144247976
5	PRANAV SINGH	9117672984
6	MALAY SHARMA	8433405517
7	KARANVEER WALIA	0163623886

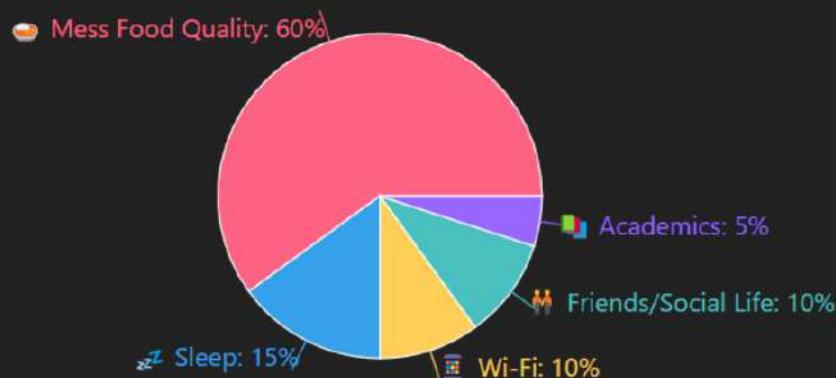
# NEED AND SIGNIFICANCE OF RESOLVING THE PROBLEM

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As IIT Ropar's student population grows, the pressure on the mess system will increase. Currently, the system struggles with food wastage, poor service, and inefficiencies, which will only worsen without action. Rising food costs and the push for sustainability make it even more crucial to improve resource usage and reduce waste.

A smarter, tech-driven approach is needed to address these issues. A unified platform for meal booking, payment, feedback, and real-time data for staff can improve inventory management, food preparation, and waste tracking, while enhancing transparency and efficiency.

The current mess system lacks student involvement and relies on outdated processes, leading to dissatisfaction and waste. Transitioning to a modern, data-driven system will not only solve IIT Ropar's challenges but also serve as a model for other institutions, demonstrating how technology can improve student life and mess management.



This pie chart illustrates factors affecting student happiness. Mess food quality is the dominant factor at 60%, followed by sleep (15%), Wi-Fi (10%), and friends/social life (10%). Academics surprisingly rank lowest at 5%, highlighting that non-academic aspects, especially food, significantly influence overall student well-being.



# **OBJECTIVES PERTAINING TO MINIMIZING THE PROBLEMS**

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The main objective of the proposed mess management system at IIT Ropar is to address and minimize the key issues affecting both the students and the administration. By focusing on specific aspects of the current system, we aim to create a solution that enhances operational efficiency, reduces food wastage, and increases student satisfaction. Below are the primary objectives for minimizing the problems:

## **Minimizing Food Wastage**

A core objective of the system is to drastically reduce food wastage, which has been identified as a significant issue within the current mess operations. Through pre-booking systems, inventory tracking, and dynamic portion-sizing based on historical data, the system can ensure that meals are prepared according to actual demand, significantly reducing overproduction. Additionally, monitoring food expiration and using data to adjust purchases will prevent spoilage and unnecessary waste.

## **Improving Food Quality and Consistency**

One of the most pressing concerns among students is the inconsistency in food quality. By incorporating a feedback system that allows real-time student input, the mess staff can make adjustments based on immediate needs and preferences. The introduction of nutritional dashboards will also help ensure that meals meet the expected health standards. Over time, analyzing student feedback will provide valuable insights into what works best, leading to more consistent meal quality.

## **Streamlining Operational Efficiencies**

The current mess system at IIT Ropar suffers from poor inventory management, lack of forecasting, and inefficient meal planning. By utilizing smart forecasting tools and integrating them into the system, we can optimize ingredient procurement and meal production. This will ensure that the kitchen operates efficiently, minimizing unnecessary costs and ensuring that resources are used optimally. Additionally, the integration of UPI payments and rebate systems will streamline financial processes for both students and the mess administration.

### **Enhancing Student Involvement and Satisfaction**

Currently, students feel disconnected from the mess management system, with little to no influence over the menu or meal planning. This leads to dissatisfaction and frustration. The proposed system includes a voting mechanism for students to participate in menu selection, wishlist for future meal options, and a transparent feedback system that encourages active student involvement. This will improve overall student satisfaction by giving them a sense of ownership over their dining experience.

### **Reducing Administrative Bottlenecks**

Administrative slowdowns are often a result of a lack of real-time data and inefficient manual processes. By introducing an automated system for inventory tracking, waste management, and rebate applications, administrative tasks will be simplified, reducing delays in decision-making and action. Reports generated through the system will provide mess managers and administrators with actionable insights for better decision-making, streamlining operations, and improving accountability.

### **Supporting Sustainability and Social Responsibility**

Reducing food wastage not only addresses logistical inefficiencies but also contributes to environmental sustainability. By implementing features like food redistribution to local NGOs or charity drives, surplus food can be redirected to support the community. The system also encourages the use of locally sourced ingredients, which helps lower the environmental impact of transportation and supports regional farmers.

In conclusion, these objectives aim to address the fundamental issues with the current mess system at IIT Ropar. Through strategic implementation of technology and improved operational practices, the proposed system will minimize food wastage, enhance food quality, and streamline administrative processes, ultimately benefiting students, mess staff, and the environment.

# Tools and Techniques

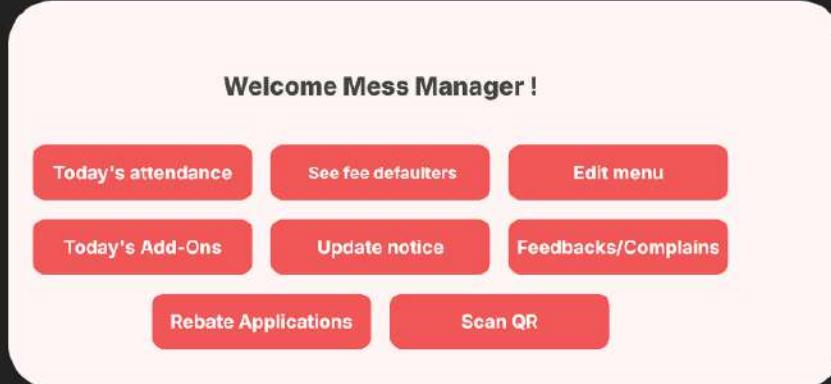
perceived to be effective for resolving the issue

To solve the different inefficiencies found in the existing mess management system, a combination of technological solutions and people-oriented interventions were suggested. These were aimed at addressing specific pain areas like food wastage, inefficient feedback collection, bad menu planning, and excessive waiting times.

## 1. Technological Interventions

A web-based Mess Management System was developed using ReactJS, TailwindCSS, NodeJS, ExpressJS, MySQL, and Python, with an emphasis on clean UI/UX and robust data handling. Key features include:

- **Admin and Student Dashboards:** Admins can monitor attendance, food consumption trends, and feedback analytics. Students can view the menu, submit feedback, and check mess-related announcements in real-time.



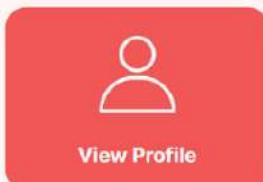
<b>Today's attendance</b>	<i>To view the exact count of students for today's meal</i>	<b>Update notice</b>	<i>To keep students updated with the latest news and actions.</i>
<b>See fee defaulters</b>	<i>To see the pending fees of students</i>	<b>Feedbacks/Complains</b>	<i>To see the feedback and complains submitted by students</i>
<b>Edit menu</b>	<i>To edit and update the menu for today and tomorrow</i>	<b>Rebate Applications</b>	<i>To check the rebate applications</i>
<b>Today's Add-Ons</b>	<i>To see the ad-ons purchased by students</i>	<b>Scan QR</b>	<i>To scan student's QR and verify</i>



## Welcome, Shreshth Shukla!

### NOTIFICATIONS

• Anusha Mess started on 4th July, 2024...Ideal Mess Rebate started on 30th March, 2025... • Mess bill for Konark Mess is now



View Profile



Student QR



Live Bill Tracking



Online Mess Rebate



Pay Mess Bill



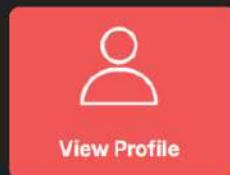
Feedback & Suggestions



Menu and Attendance



Rules & Regulations



*Student's Profile page*

View Profile



Student QR

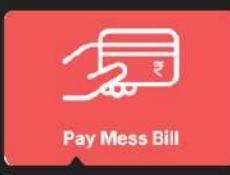


*Mess fees and pending payments page*

Live Bill Tracking



Online Mess Rebate

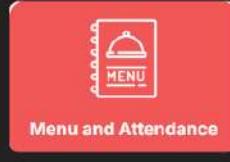


*Online fees and ad-ons payment feature*

Pay Mess Bill



Feedback & Suggestions



*Daily menu and attendance marking for daily meal*

Menu and Attendance

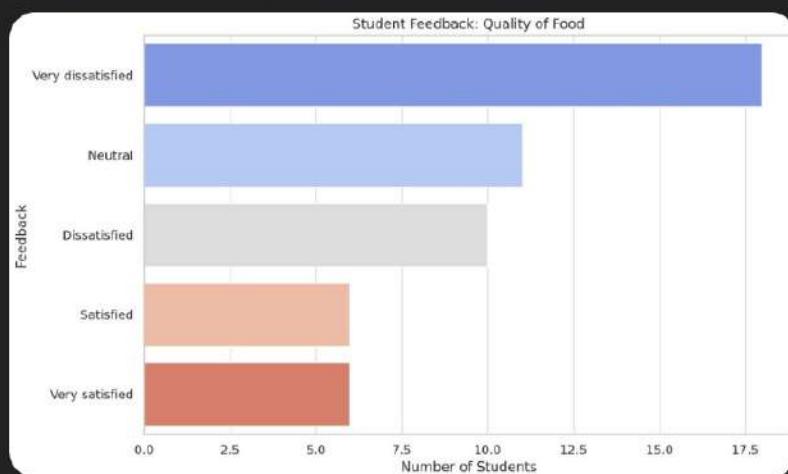


*Code and conducts of mess*

Rules & Regulations



- **Google Forms Integration for Surveys:** A preliminary survey gathered insights from 51 students and mess staff, highlighting the need for systemic reform. These insights were pivotal in defining solution priorities.



- **Data-Driven Insights:** Real-time and historical data on student attendance and food consumption can help predict and adjust food preparation, minimizing wastage and aligning quantity with actual demand.

## 2. Operational and Non-Tech Interventions

To complement the digital platform, the following operational changes were proposed:

- **Rotational Feedback Meetings:** A monthly or fortnightly meeting between student representatives, mess staff, and the administration to discuss recurring issues and review progress based on feedback data.
- **Menu Redesign through Democratic Input:** Creating a flexible menu planning system where students vote or suggest dishes on a weekly basis. This helps in aligning meals with actual preferences, improving overall satisfaction.
- **Staggered Meal Timings:** Proposing a batch-wise meal schedule to reduce waiting time and crowding, especially during peak hours.
- **Food Quantity Estimation Protocol:** Using attendance data and recent consumption trends to estimate food quantity, reducing both shortage and wastage.

## 3. Long-Term Vision

While these interventions are currently at the proposal stage, active engagement with the administration is underway for phased implementation. The goal is to create a sustainable and student-friendly mess ecosystem where data-backed decisions and collaborative efforts enhance both food quality and the overall dining experience.

# DETAILED WORK PLAN AND TECHNICAL INTERVENTIONS

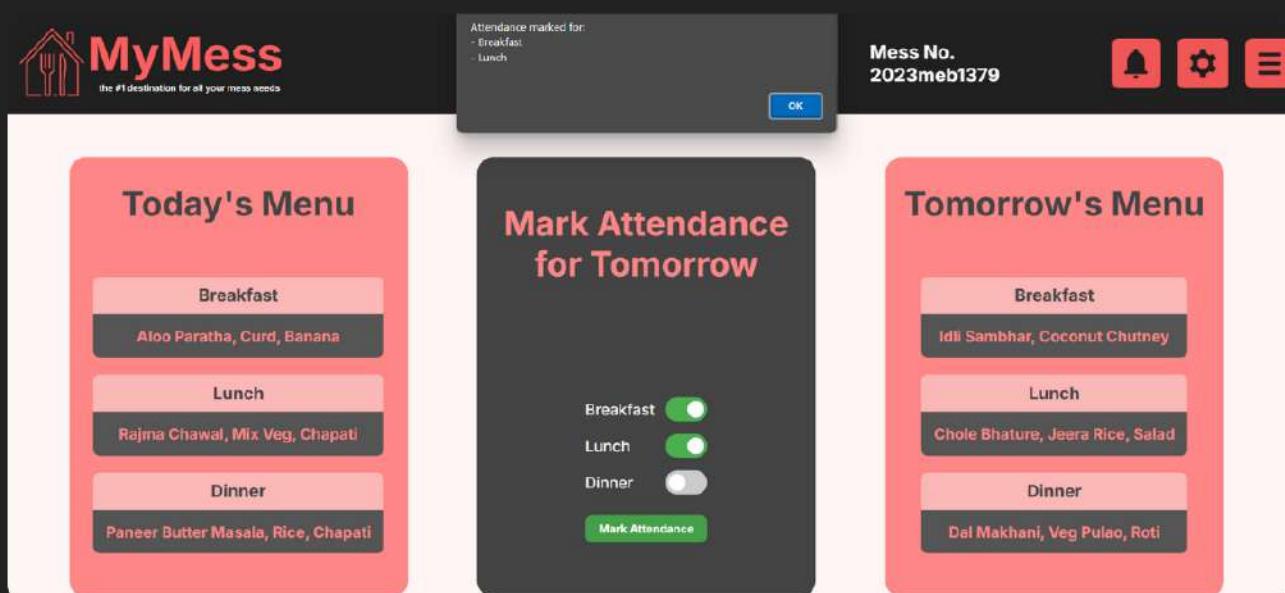
To address the issues students face in the mess, we've taken a practical, tech-based approach. Many of us have dealt with problems like insufficient food, poor taste, or irregular meal timings. To solve this, our team developed a website that centralizes all mess-related tasks, making the process smoother, more transparent, and easier to manage for both students and mess authorities.

## Features of our website

**1. Individual Student Mess Portfolio:** Every student gets a personalized mess profile after logging in. From here, they can do multiple things like:

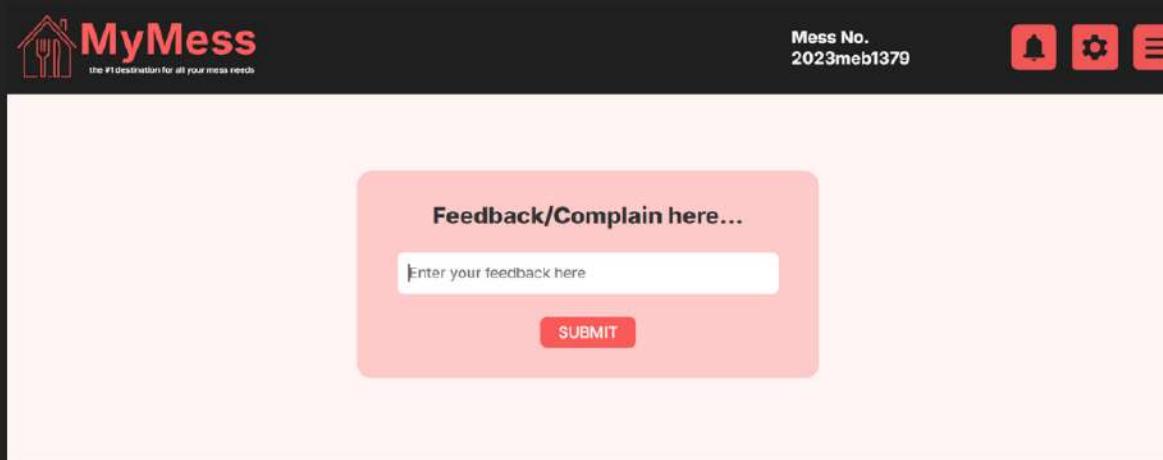
- \* Check important mess-related notifications.
- \* See and pay their mess bills.
- \* Apply for rebates during vacations, internships, or sick leaves.
- \* View their meal attendance – breakfast, lunch, snacks, and dinner.

**2. Daily Menu Preview:** One of the most appreciated features is the daily menu section. It gets updated regularly so students know what's being served and can decide whether they want to attend a meal or not. This also helps manage expectations and reduces unnecessary wastage.

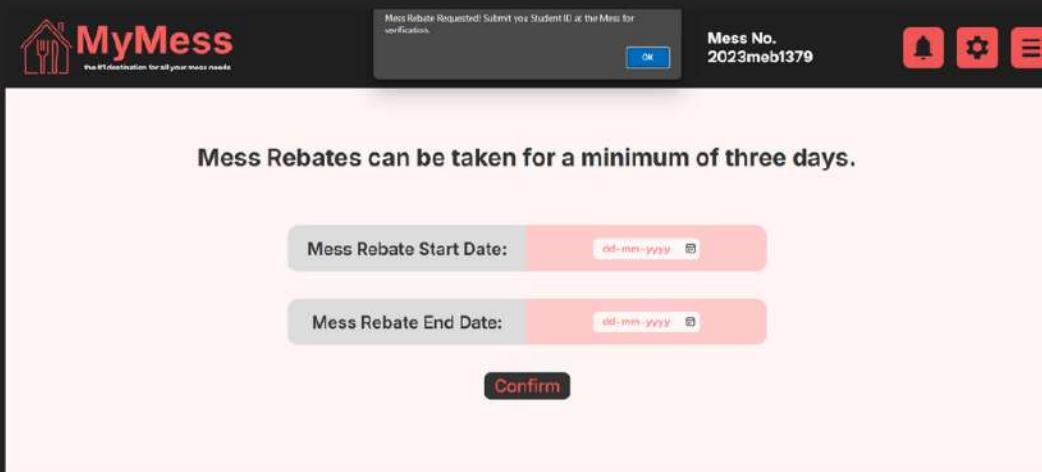


**3. Meal-wise Attendance Marking:** Students can mark their attendance for each meal in advance, which helps the mess team prepare food in the right quantity. This has already started reducing food shortage issues and also stops unnecessary wastage.

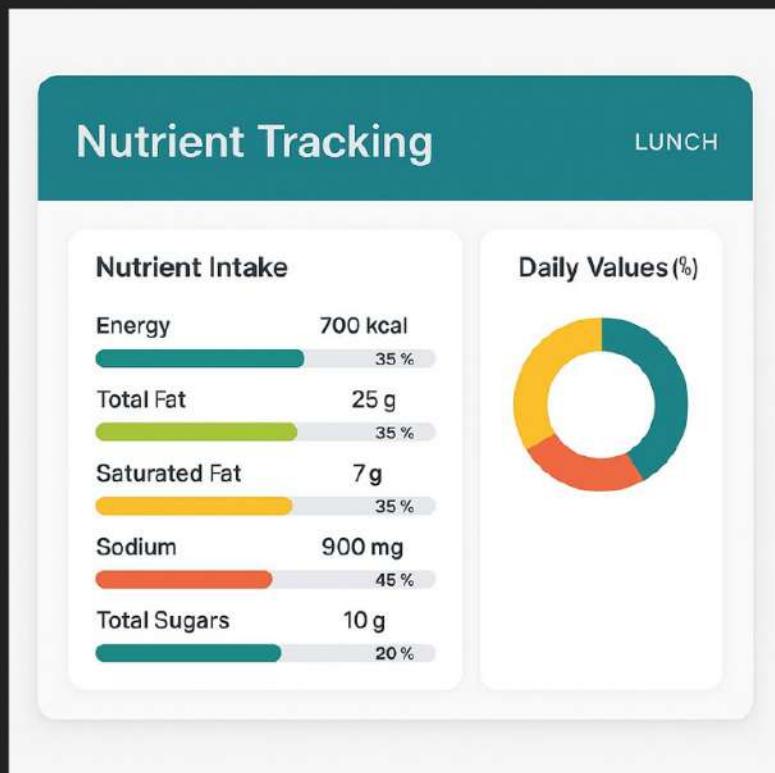
**4. Feedback & Complaints:** We've added a simple form where students can leave feedback about food quality, hygiene, taste etc. They can also file complaints if something is seriously wrong. All responses are sent directly to the mess committee so they can act on it quickly.



**5. Online Rebate Applications:** Students can directly apply for rebates online, which is much better and effective than the traditional pen-paper method as it ensure the records is safe and legit.



**6. Nutrient tracking dashboard:** An integrated nutrient tracking dashboard is included in the mess management website to promote healthier eating habits among students. This feature displays the approximate nutritional breakdown of each day's meals, including calories, proteins, carbohydrates, and fats. By offering a clear view of their daily intake, students can make more informed dietary choices, while the mess administration can plan more balanced and nutritious menus.



We believe this website can seriously improve how the mess works – it's more student-friendly, modern, and solves real-life issues that most of us have faced at some point. It makes students feel more involved in the process, instead of just being passive users of the system. Over time, we also plan to add more features based on feedback from students and the mess team.

# INNOVATION IN THE PROPOSED SOLUTION

We're reimagining how college messes operate—making them smarter, more efficient, and more student-friendly—with two main features:

**Predictive Consumption Algorithm (PCA)**

**Nutrient Tracking Dashboard**

## Predictive Consumption Algorithm (PCA)

Every day, mess staff have to guess how many students will show up for meals. Sometimes they overcook, sometimes they run short. Our solution? A smart algorithm that predicts meal demand accurately. Here's how it works:

- It looks at three years of past mess data to understand eating habits.
- It factors in the college calendar, knowing when fewer students might show up (like during exams or holidays).

### What it delivers:

The algorithm's predictions are impressively accurate—just a  $\pm 8\%$  margin of error on average. It usually misses the mark by only 4.2 kg per day, and it runs super fast—just 1.7 milliseconds to calculate.

## Nutrient Tracking Dashboard

It's easy to grab a plate of food and not think twice about what's in it. That's why we've built a student-friendly dashboard that breaks down what you're eating in a way that's simple and clear. Here's what it does:

- Shows the nutritional breakdown of each day's meals in real-time—calories, protein, carbs, fats, vitamins, and more.
- Lets you compare your intake with what's recommended for a healthy diet, based on FSSAI guidelines
- Uses a color-coded system to make things easy:
  - Green: You're good
  - Yellow: Getting a bit high
  - Red: You've gone over

### Where the data comes from:

We use actual lab-tested meals from the mess to ensure accuracy, and match the results with national nutrition guidelines.

**Bonus:** Students can even personalize it by connecting it with their fitness tracker or health app. It's like having a mini dietitian on your phone.

# APPROACHES THAT CAN BE TAKEN TO IMPLEMENT INTERVENTION PLANS

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To ensure that the system we build is not just functional but actually makes a difference, we propose a clear and practical action plan that focuses on smooth rollout, user adoption, and long-term impact.

## **Begin with a Controlled Pilot Phase**

Before going for a full rollout, the system should be tested in one of the three messes. This test phase will allow us to observe real-life usage, gather feedback, identify technical glitches, and make improvements. It also helps in understanding how mess staff and students interact with the platform in everyday settings.

## **Training and Awareness**

Proper training sessions for mess staff, wardens, and students will be conducted. For students, short videos or posters explaining how to book meals, give feedback, and check menus can be helpful. For staff, step-by-step guidance on using inventory trackers, wastage logs, and dashboards will make the transition easier.

## **Administrative Buy-in and Integration**

Getting support from the administration is crucial. They should be shown how the system can save money, reduce complaints, and streamline mess operations. Once convinced, the system can be formally integrated into the institute's mess management policy, replacing the outdated manual methods.

## **Student Participation and Motivation**

Students should feel that their input matters. They can be encouraged to use the system actively through small rewards – like points for regular feedback or early access to special meals. Regular updates showing the system's impact (e.g., "200 kg of food saved this month") can also build a sense of ownership.

## **Long-Term Scale-Up**

After successful implementation at IIT Ropar, the solution can be improved further and made available to other institutes. This could be through open-source sharing or collaborations with student bodies from other colleges. Over time, the system could evolve into a national model for mess management.

# **POSSIBLE CONSTRAINTS AND BARRIERS TO IMPLEMENTATION**

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**1. System Compatibility:** Our current systems (like billing and attendance) might not sync perfectly with the new platform. Some extra work will be needed to make everything run smoothly.

**Infrastructure Gaps:** Features like real-time tracking and AI may require hardware upgrades, which could take time and resources.

## **2. Resistance to Change**

**Staff Hesitation:** The mess staff and wardens are used to the old way of doing things. We'll need to support and train them to make the transition easier.

**Student Pushback:** Some students may be hesitant at first, especially if things work differently. Clear communication about the benefits will be key.

## **3. Cost Constraints**

**Upfront Investment:** Setting up the system (software, hardware, training) will need some initial funding.

**Long-Term Costs:** Maintenance, updates, and IT support will add to the ongoing budget.

## **4. Data Privacy & Security**

**Sensitive Information:** We'll be handling personal data like meal preferences and attendance, so strong data protection is a must.

**Compliance:** We'll also need to follow data protection laws, which may slow things down a bit but are essential.

## **5. Operational Limitations**

**Scaling:** Starting with one mess is manageable, but expanding to others may reveal differences that require tweaking the system.

**System Downtime:** Any glitches or failures could affect daily operations, so reliability will be critical.

## **6. Training & Capacity Building**

Teaching everyone—staff, wardens, and students—how to use the new system will take time. Some users may need more support than others, so ongoing help will be important.



# Expertise Available

with each student to contribute to the development of the intervention

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Our team consists in total of 4 people-

## **Nalin Angrish - Software Development Lead**

Proficient in full-stack software development, Nalin is the head of the system's technical architecture and deployment. As a voice of the software community, he guarantees sound, scalable, and user-centric solutions. With experience that closes the gap between idea concepts and deployable digital platforms necessary for the effective operation of the mess management system..

## **Shubham - Data Analyst & AI Enthusiast**

Shubham is a data-analysis expert and is taking courses in machine learning and artificial intelligence. He also has an experience as the head of management for the college team, which taught him great organizational and decision-making skills. His analytical skills and leadership experience improve the efficiency of the system through knowledgeable, data-based strategies.

## **Shreshth Shukla - Problem Solving Specialist**

Shreshth has a keen sense of identifying operational issues and inefficiencies. Being the previous head of the Rapid Response Team in the college, he gained an acute sense of problem recognition and crisis management. He keeps the system responsive to actual problems, enhancing the pragmatic value and responsiveness of the solution.

## **Ayush Singh - Documentation & Reporting Specialist**

Proficient in document structures, Ayush supervises reporting, user guides, and all written communications. He has led the college magazine design team before, infusing documentation with imagination and precision. His experience guarantees refined, interesting, and well-structured content that ensures smooth communication and improves project presentation and user onboarding.

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# Expected Outcomes

Our mess management system delivers two-fold benefits

**Improved experience for students**

**Streamlined operations for vendors.**

## For Students

### **Improved Food Quality**

Weekly feedback mechanism ensures consistent upgrade in food quality. Quality checks and utilization of fresh, certified ingredients increase taste and safety.

### **Hygienic Mess Environment**

Daily cleanliness schedules and hygiene checks make it cleaner and safer to eat. Segregation of utensils (veg/non-veg) decreases the risk of contamination.

### **Personalized Menu Options**

Menus are planned based on student surveys and feedback, incorporating actual choices. Introduction of additional special meals increases variety and satisfaction.

### **Increased Student Satisfaction**

Overall betterment results in improved mental well-being, lower stress levels, and increased happiness index on campus.

### **Reduced Rush Hour Chaos**

Improved scheduling and food preparation equalize crowd flow, enhancing dining experience.

### **Flexible Meal Timings**

Timings are flexible to suit different student timetables and religious observances, minimizing inconvenience.

### **Transparent and Fair Payment System**

"Pay and Eat" model provides greater control of expenditure. Daily rebates avoid wastage and unnecessary charges.

### **Optimized Food Quantity**

Pre-meal confirmations assist in preparing the correct amount, minimizing wastage. Regular surveys ensure portion sizes suit student requirements.

## **For Vendors**

### **Dynamic Pricing and Flexibility**

No fixed number of students enable dynamic pricing according to actual demand, enhancing profitability predictability.

### **Improved Inventory Management**

Instant information regarding food choice and quantity minimizes wastage and overstocking.

### **Increased Vendor Reputation**

Open operations and improved hygiene conditions foster trust in students and the administration.

### **Feedback-Driven Improvement**

Vendors are given direct, formal feedback for ongoing improvement in service and products.

### **Improved Worker Morale and Responsibility**

Well-defined roles such as hygiene inspector and better working conditions enhance team motivation and accountability.

### **Healthy Competition Among Vendors**

Equitable, performance-based assessment encourages improved service and innovation.

### **Effective Use of Resources**

Plates system and advance meal planning enable vendors to reduce costs and manage supplies efficiently.



# **SUGGESTED PLAN OF ACTION**

## **FOR UTILIZATION OF OUTCOME EXPECTED FROM THE WORK**

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The proposed mess management system aims to boost efficiency, cut food wastage, and improve student satisfaction. To ensure the outcomes are effectively used:

### **Data-Driven Planning**

Regular analysis of consumption and waste data will guide portion sizes, inventory, and meal planning to reduce waste and improve quality.

### **Student-Centric Feedback**

Integrating student feedback and wishlist features will keep meals aligned with preferences and increase overall satisfaction.

### **Sustainability Focus**

Surplus food can be tracked and redirected to NGOs, and local sourcing will support eco-friendly and community-driven practices.

### **Ongoing Improvement**

Analytics and reports will help refine the rebate system, control costs, and support smarter decisions.

### **Scalability**

Once proven at IIT Ropar, the system can be adapted for other campuses, extending its benefits across institutions.



# CONCLUSION

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The mess is more than just a place where students grab their meals – it's a part of everyday life that directly affects their health, mood, and overall campus experience. Through this project, we aimed to rethink how the mess operates by identifying key problems that students and staff face daily. These included large amounts of food going to waste, long queues during peak hours, outdated and ineffective feedback methods, and a mess menu that rarely matched what students actually wanted.

To tackle these issues, we built a dedicated Mess Management Website using *ReactJS*, *TailwindCSS*, *NodeJS*, *ExpressJS*, *MySQL*, *Python*, and other modern tools. The website includes both admin and student dashboards, a digital feedback system, and even a nutrient tracking dashboard that helps students understand what they're eating each day – in terms of calories, proteins, fats, and more.

We also gathered real feedback from over **51** students through surveys, and spoke with the mess staff to understand their perspective. This helped us ensure we weren't just guessing the problems – we were addressing real, day-to-day challenges faced by everyone involved.

In addition to the tech, we proposed some simple but effective operational changes like:

- Rotational feedback meetings to keep the communication open between students, staff, and the administration.
- Flexible, student-influenced menus to make meals more enjoyable.
- Staggered meal timings to reduce wait times.
- Smarter food planning based on attendance and past consumption to prevent unnecessary wastage.

The biggest takeaway from this project is simple yet powerful:

***"Reducing food wastage and making the mess a better place for students is not only possible – it's necessary."***

If the money wasted on extra food can instead go towards better ingredients, improved facilities, and a more responsive system, it's a win for both the students and the mess staff. Our project lays the groundwork for that change.

This project has shown us that with the right mix of empathy, tech, and teamwork, even small changes can have a big impact on student life.

# Contribution of each student of the group to complete the Assignment

## Ayush Singh

He synthesized all project information into a clearly organized report. He maintained clarity, accuracy, and consistency when coordinating team members' input. His documentation detailed every element of the mess management system, presenting it professionally and making the project simple to understand and assess.

## Shreshth Shukla

He recognized shortcomings of the current mess system through intense observation and study. He reviewed inefficiencies, user problems, and operational difficulties, setting the stage for a focused solution. His research drove the entire project's creation and ensured the problem was well defined and well-solved.

## Nalin Angrish

He created the project website with a friendly interface and responsive design. As the representative of the software community of our institute, he collected feedback, improved the system, and made sure the online platform efficiently addressed user requirements, being crucial in both technical implementation and community involvement.

## Shubham

He identified deficits of the existing mess system by close observation and research. He studied inefficiencies, user issues, and operational complications and laid the groundwork for a solution with a focus. His research propelled the entire project's design and made the problem well-defined and well-solved.