UTM
UNIVERSITI TEKNOLOGI MALAYSIA

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FACULTY OF COMPUTING
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Project - Phase 1
<CampusUnity>
SECD2613 – SYSTEM ANALYSIS AND DESIGN

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1.0 Introduction

In the dynamic environment of higher education, effective management of campus resources is paramount for the success of educational institutions. A Campus Resource Management System (CRMS) represents a pivotal solution to optimize the allocation and utilization of various resources within a university or college campus, improving efficiency, communication, and resource utilization across various departments and stakeholders. By integrating diverse functionalities into a unified platform, the CRMS enhances operational efficiency, facilitates seamless communication, and empowers stakeholders to make data-driven decisions.

The proposed CRMS will serve as a comprehensive platform to manage diverse campus resources, including facilities, events, students, faculty, and staff. By integrating multiple functionalities into a single system, the CRMS will simplify resource allocation, scheduling, communication, and decision-making processes within the campus environment.

2.0 Background Study

The conception of a Campus Resource Management System (CRMS) is rooted in the recognition of persistent challenges faced by educational institutions in resource management. Traditional approaches often rely on manual processes, fragmented systems, and limited coordination, leading to inefficiencies and suboptimal utilization of campus resources.

Many universities use disparate systems or manual methods to manage facilities, events, student data, and staff information. This fragmentation often results in duplication of efforts, conflicting schedules, and underutilization of resources. Without a centralized system, stakeholders struggle to gain real-time visibility into resource availability. This lack of coordination leads to scheduling conflicts and impedes effective resource utilization. Limited communication channels hinder collaboration among departments, faculty, students, and administrative personnel. This can result in miscommunications, missed opportunities, and delays in decision-making. Manual handling of tasks such as facility bookings, event coordination, and student enrollment is labor-intensive and prone to errors, consuming valuable time and resources.

Automate resource allocation processes, streamline administrative tasks, and optimize resource utilization to reduce operational costs and improve productivity. Facilitate seamless communication and information sharing among stakeholders through integrated messaging, notifications, and real-time updates. Serve as a centralized repository for campus data, providing stakeholders with a comprehensive view of resources, events, academic records, and personnel information. Leverage data analytics to generate actionable insights, enabling informed decision-making, strategic planning, and resource optimization. Develop an intuitive user interface that caters to the needs of students, faculty, staff, and administrators, offering personalized services and empowering self-service capabilities.

In conclusion, the development of a Campus Resource Management System (CRMS) is instrumental in addressing the complex challenges of resource management within educational institutions. By integrating functionalities such as facility booking, event management, student administration, and communication into a unified platform, the CRMS aims to enhance operational efficiency, foster collaboration, and elevate the overall campus experience for stakeholders. This project represents a strategic initiative to modernize campus operations and pave the way for a more efficient and interconnected educational ecosystem.

3.0 Problem Statement

1. Difficulty in managing and tracking facility bookings:

Managing and tracking facility bookings poses significant challenges within the campus environment. Users often struggle to find available campus facilities for their events or activities due to inefficient booking processes. Additionally, facility managers face difficulties in tracking resource utilization and enforcing booking policies effectively, leading to scheduling conflicts and dissatisfaction among users. Overlapping bookings and resource conflicts are common occurrences, causing disruptions and hindering the smooth operation of campus facilities.

2. Inefficient event management processes:

The current event management processes on campus are inefficient and fragmented, leading to challenges in coordinating and managing campus events, workshops, and seminars. Event organizers often face difficulties in managing event logistics and communication effectively, resulting in confusion among stakeholders. Manual event registration and attendee management processes further exacerbate these challenges, leading to lower event turnout and reduced overall success.

3. Complex student management workflows:

Student management workflows within the campus environment are complex and inefficient, posing challenges for both administrators and students. Administrators struggle to manage student enrollment, course registration, and academic records accurately and efficiently. Similarly, students encounter difficulties accessing relevant academic information, such as schedules, grades, and progress tracking, leading to decreased engagement and academic success.

4. Inefficient faculty and staff management systems:

Efficient faculty and staff management is critical for the smooth operation of campus activities and programs. However, current HR processes face challenges in managing faculty and staff information, recruitment, scheduling, and performance evaluation effectively. Faculty members also encounter difficulties accessing teaching schedules, submitting grades, and communicating with students efficiently, impacting overall productivity and performance.

5. Communication gaps and lack of timely notifications:

Communication gaps and lack of timely notifications hinder effective collaboration and decision-making within the campus community. Stakeholders often struggle to stay informed about campus events, bookings, and deadlines due to ineffective communication channels and fragmented information dissemination. Important announcements, reminders, and alerts are not delivered promptly, leading to missed opportunities and disruptions in campus operations.

4.0 Proposed Solutions (include feasibility study – technical, operational, economical - CBA)

1. Implement an intuitive facility booking and management module:

To address these challenges, it is essential to implement an intuitive facility booking and management module within the Campus Resource Management System (CRMS). This module should feature a user-friendly interface that allows users to easily search, view availability, and book campus facilities. Key functionalities should include the ability to set booking policies, manage reservations, and track resource utilization. Furthermore, integrating calendar synchronization and real-time updates can help prevent scheduling conflicts and improve the overall user experience, ensuring efficient utilization of campus facilities.

2. Introduce a comprehensive event management system:

To streamline event management processes, a comprehensive event management system should be introduced within the CRMS. This centralized platform should facilitate the creation, scheduling, and management of campus events and activities. Key features should include event registration, promotion, attendee management, and feedback collection. By integrating communication channels and tools, such as email and messaging, seamless event coordination and promotion can be achieved, enhancing the overall effectiveness and success of campus events.

3. Enhance student management functionalities:

To address these challenges, a robust student management system should be developed as part of the CRMS. This system should encompass features for managing enrollment, course registration, and academic records in a centralized and accessible manner. Student portals can be introduced to provide students with easy access to their academic profiles, schedules, grades, and progress tracking. Additionally, integrating academic advising and support services can further enhance student engagement and success, fostering a conducive learning environment on campus.

4. Streamline faculty and staff management processes:

To streamline faculty and staff management processes, dedicated HR modules should be developed within the CRMS. These modules should facilitate the management of faculty and staff information, recruitment, scheduling, and performance evaluation in a centralized and efficient manner. Faculty portals can be introduced to provide easy access to teaching schedules, grade submissions, and communication tools, enhancing productivity and collaboration. Automating leave management processes can further improve workforce planning and resource allocation efficiency, ensuring smooth campus operations.

5. Improve communication and notification mechanisms:

To address communication challenges, the CRMS should integrate robust communication and notification mechanisms. This integration should facilitate seamless information exchange among stakeholders through various channels, such as email, messaging, and notifications. Personalized notifications, announcements, and reminders can be implemented to keep stakeholders informed about events, bookings, and deadlines in a timely manner. Furthermore, developing a centralized dashboard for accessing important updates and alerts can enhance collaboration and decision-making within the campus community, promoting efficiency and transparency.

Technical Feasibility:

The Campus Resource Management System (CRMS) will be accessible through web browsers on both mobile devices and PCs, ensuring ease of access for users without the need for additional installations. The system will require standard gadgets such as smartphones, tablets, or computers, along with stable internet connectivity to access and utilize its features effectively. Additionally, the CRMS will utilize a robust database system to store and manage campus resources data efficiently. The system will include a sorting feature to allow users to organize data based on their preferences, enhancing usability.

Operational Feasibility:

Operational feasibility for the Campus Resource Management System (CRMS) will rely on user-friendly interfaces and straightforward workflows to support daily operations within the campus community. While ongoing supervision and maintenance will be necessary to ensure smooth system performance, extensive technical expertise will not be required for regular users to utilize the system effectively. Training and support materials will be provided to help users navigate the CRMS and address any issues that may arise. Clear communication channels will be established to facilitate feedback and ensure that user needs are met effectively. Overall, the CRMS will be designed to streamline campus resource management processes and enhance operational efficiency without overly complex technical requirements

Economic Feasibility (CBA)

Assumptions	
Discount Rate	**10%**
Sensitivity Factor (Cost)	**1.1**
Sensitivity Factor (Benefits)	**0.9**
Annual Change In Production Costs	**7%**
Annual Change In Benefits	**5%**

Estimated Cost	
Hardware	**RM 15000**
Software	**RM 15000**
Maintenance	**RM 4000 per year**
Training	**RM 6500**
Consultant	**RM 5000**

Estimated Benefits	
Improve Customer Services	**RM 25000**
Increase Productivity	**RM 25000**

COSTS	Year 0	Year 1	Year 2	Year 3
Development Cost (One-time)				
Hardware	16500			
Software	16500			
Training	7150			
Consultant	5500			
Total (Development Cost)	**45650**			
Production Cost				
Maintenance		4400	4708	5038
Annual Production Costs		**4400**	**4708**	**5038**
(PRESENT VALUE)		**4000**	**3891**	**3785**
ACCUMULATED COSTS		**49650**	**53541**	**57326**

BENEFITS	Year 0	Year 1	Year 2	Year 3
Improve Customer Services		22500	23625	24806
Improve Productivity		22500	23625	24806
Annual Benefits		**45000**	**47250**	**49613**
(PRESENT VALUE)		**40909**	**39050**	**37275**
ACCUMULATED BENEFITS		**40909**	**79959**	**117233**
GAIN OR LOSS		**(8741)**	**26418**	**59908**
PROFITABLE INDEX	**1.31**			

5.0 Objectives

Our project goal is to design and develop a comprehensive Campus Resource Management System (CRMS) aimed at optimizing various administrative and operational processes within a university campus. With the continuous development and expansion of higher education, modern university campus management faces more and more challenges, including uneven resource allocation, information island phenomenon and cumbersome processes. Therefore, our goal is to use the power of information technology to create an efficient, intelligent and comprehensive management system to improve the level and efficiency of campus management.

The main purpose of CRMS is to provide a platform for centralized management of various campus resources, including facilities, activities, students, faculty and staff, etc. By integrating multiple functional modules, we hope to achieve resource utilization optimization, process automation and centralized information management. This will help solve many pain points in campus management, such as confusing classroom booking, opaque event information and cumbersome student management, thereby improving the efficiency and quality of campus operations.

Our main goal is to design a modular system that includes modules such as facility booking and management, event management, student management, faculty and staff management, and communication and notification. These modules will be interconnected to enable information sharing and interaction, thereby achieving collaboration and coordination among all departments of the whole school. We will focus on the flexibility and scalability of the system to cope with the changing needs of campus management in the future. During the project implementation, we will focus on requirements collection, system modeling, database design, interface design, and testing.

Through close cooperation and repeated communication with potential users, we will ensure that the system design meets actual needs and can effectively solve various challenges in campus management. We will use advanced modeling and design tools such as use case diagrams, class diagrams, and activity diagrams to guide the design and development process of the system. Ultimately, our goal is to design an easy-to-use, user-friendly and fully functional campus resource management system to improve campus operation efficiency, enhance students' educational experience, and provide a better working environment for faculty and staff. Through this project, we hope to provide educational institutions with an effective management tool to cope with the growing needs of campus management and contribute to the development of education.

6.0 Scope of the Project

First and foremost, facility booking and management module that will not only allow users to search, view availability and book campus facilities (such as classrooms, auditoriums, laboratories and sports fields), but will also provide a convenient online payment function to simplify the booking process. In addition, the system will also provide facility usage history and reports for managers to plan and optimize resources.

The second is the event management module. In addition to allowing event organizers to create, schedule and manage campus events, seminars and extracurricular activities, this module will also provide statistics and analytical reports to help organizers evaluate the effectiveness and participation of the event. In addition, this module will also support online ticket management and ticket sales, as well as on-site event check-in functions.

Next is the student management module. In addition to allowing administrators to manage student registration, course registration, academic records and student activities, this module will also provide student feedback and satisfaction survey functions so that the school can understand students' experience and opinions on teaching and campus life.

In addition, the faculty and staff management module, in addition to allowing human resources administrators to manage faculty and staff information, recruitment, scheduling, performance appraisal, leave management and other functions, will also provide faculty and staff training project management and online training resource library to promote the career development and capacity improvement of faculty and staff.

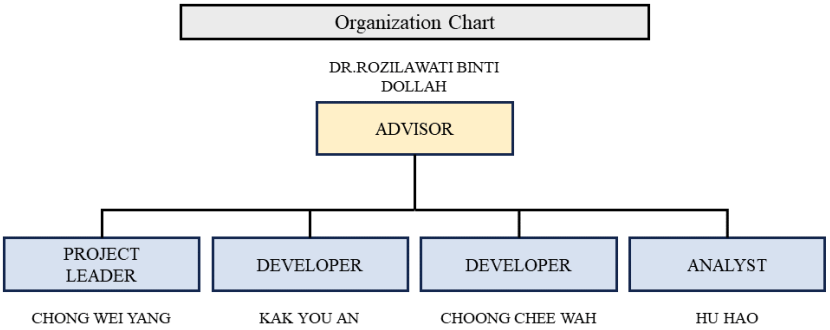
Finally, the communication and notification module will provide multi-channel communication and notification functions, including email, mobile text messages and in-app notifications to ensure timely communication and receipt of information. In addition, the system will also support campus broadcasting and emergency

notification functions to issue important notices and safety alerts to students and faculty and staff in a timely manner.

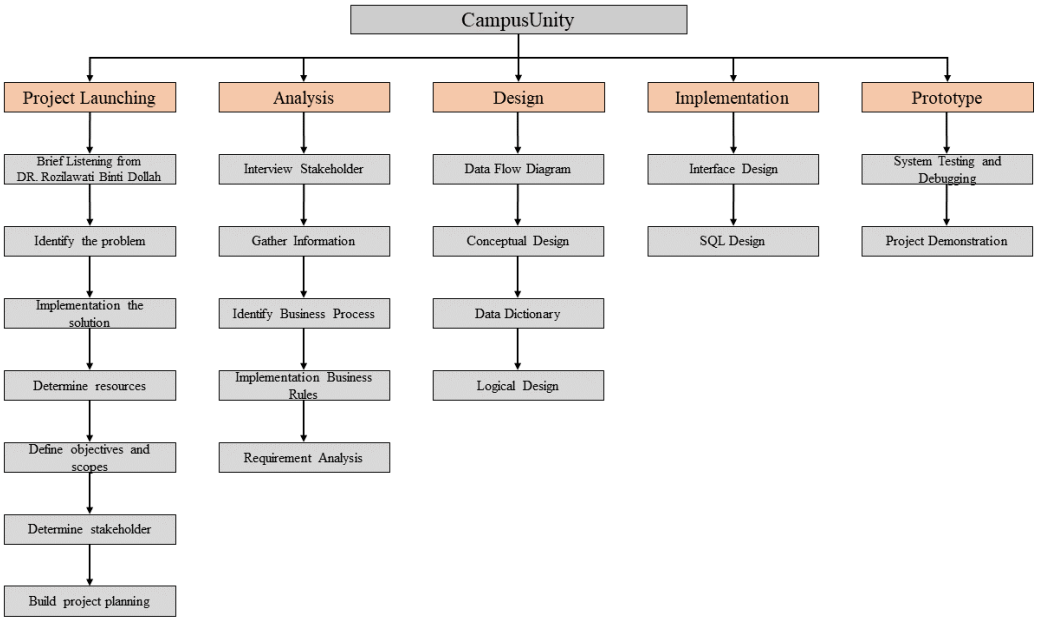
The project scope also includes the following key activities and deliverables:
First, requirements analysis and specifications, which aim to clarify the functional and performance requirements of the system. Second, system design documents, including system architecture, database design, and interface design, are intended to provide guidance for the implementation and development of the system. Next is the implementation and testing phase of the system, where the team will be responsible for developing and deploying the system, and conducting functional testing and user acceptance testing to ensure the stability of the system and meet user expectations. Finally, user training and support will be provided to end users to enable them to use the system proficiently, and subsequent technical support will be provided to ensure the smooth operation of the system in daily use.

7.0 Project Planning

7.1 Human Resource

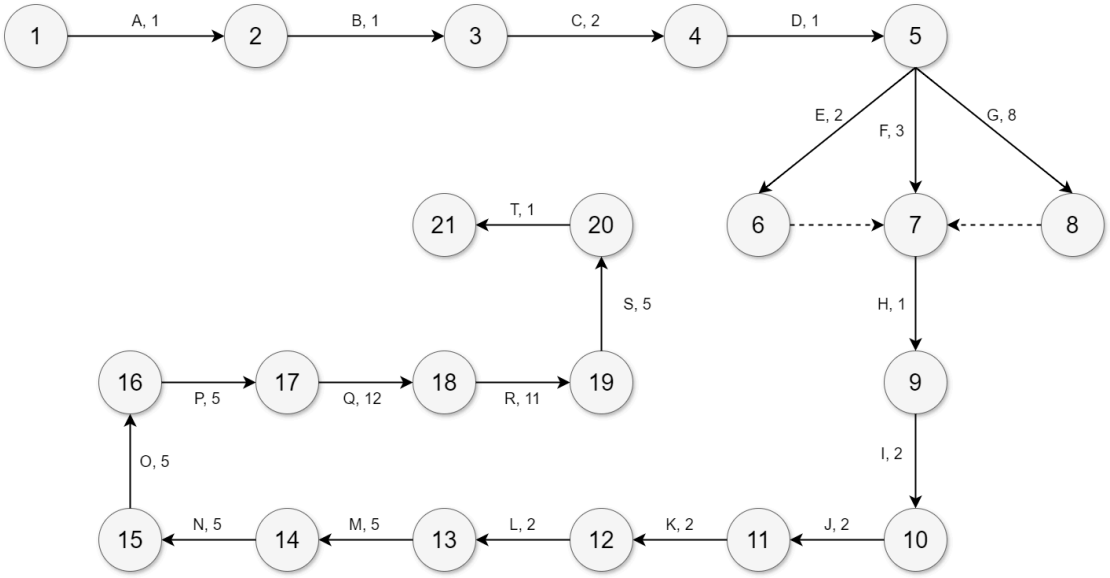


7.2 Work Breakdown Structure (WBS)



7.3 PERT Chart (based on WBS)

Activity		Predecessor	Duration(Days)
A	Brief listening from Dr. Rozilawati Binti Dollah	None	1
B	Identify the problem	A	1
C	Implement the solution	B	2
D	Determine resources	None	1
E	Define objectives and scopes	D	2
F	Determine stakeholder	D	3
G	Build project planning	D	8
H	Interview stakeholder	F	1
I	Gather Information	H	2
J	Identify business process	I	2
K	Implement business rules	J	2
L	Requirement analysis	K	2
M	Data flow diagram	L	5
N	Conceptual design	M	5
O	Data dictionary	N	5
P	Logical design	O	5
Q	Interface design	P	12
R	SQL design	Q	11
S	System testing and debugging	R	5
T	Project demonstration	S	1



Note: All durations are in days

Path 1: A - B - C - D - E - H - I - J - K - L - M - N - O - P - Q - R - S - T
Length 1: 1 + 1 + 2 + 1 + 2 + 1 + 2 + 2 + 2 + 2 + 5 + 5 + 5 + 5 + 12 + 11 + 5 + 1 = 65

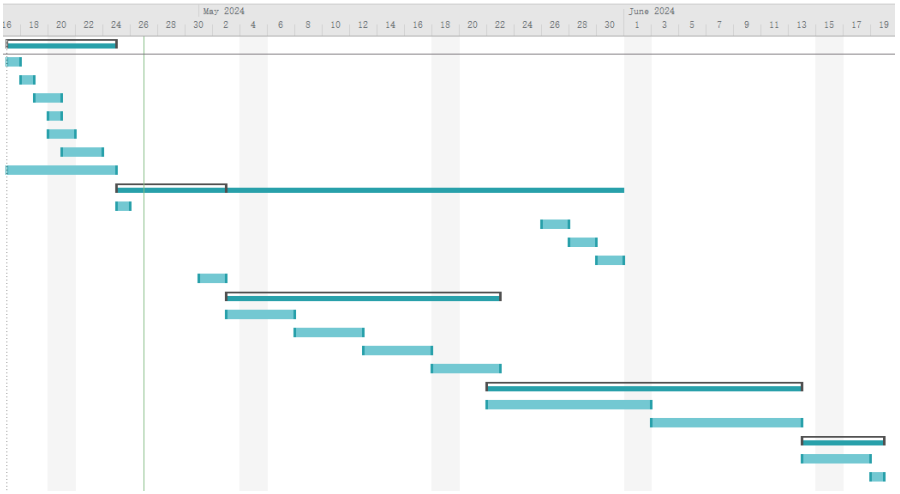
Path 2: A - B - C - D - F - H - I - J - K - L - M - N - O - P - Q - R - S - T
Length 2: 1 + 1 + 2 + 1 + 3 + 1 + 2 + 2 + 2 + 2 + 5 + 5 + 5 + 5 + 12 + 11 + 5 + 1 = 66

Path 3: A - B - C - D - G - H - I - J - K - L - M - N - O - P - Q - R - S - T
Length 3: 1 + 1 + 2 + 1 + 8 + 1 + 2 + 2 + 2 + 2 + 5 + 5 + 5 + 5 + 12 + 11 + 5 + 1 = 71

Since the critical path is the longest path in the network diagram, path 3 is the critical path of the project.

7.4 Gantt Chart

Task Name	Duration	Start Date	End Date
Project Launching	**8 days**	**Wed 17/4/24**	**Wed 24/4/24**
Brief listening from Dr. Rozilawati Binti Dollah	1 day	Wed 17/4/24	Wed 17/4/24
Identify the problem	1 day	Thu 18/4/24	Thu 18/4/24
Implement the solution	2 days	Fri 19/4/24	Sat 20/4/24
Determine resources	1 day	Sat 20/4/24	Sat 20/4/24
Define objectives and scopes	2 days	Sat 20/4/24	Sun 21/4/24
Determine stakeholder	3 days	Sun 21/4/24	Tue 23/4/24
Build project planning	8 days	Wed 17/4/24	Wed 24/4/24
Requirement Analysis	**8 days**	**Thu 25/4/24**	**Thu 2/5/24**
Interview stakeholder	1 day	Thu 25/4/24	Thu 25/4/24
Gather information	2 days	Sun 26/5/24	Mon 27/5/24
Identify business process	2 days	Tue 28/5/24	Wed 29/5/24
Implement business rules	2 days	Thu 30/5/24	Fri 31/5/24
Requirement analysis	2 days	Wed 1/5/24	Thu 2/5/24
Design	**20 days**	**Fri 3/5/24**	**Wed 22/5/24**
Data flow diagram	5 days	Fri 3/5/24	Tue 7/5/24
Conceptual design	5 days	Wed 8/5/24	Sun 12/5/24
Data dictionary	5 days	Mon 13/5/24	Fri 17/5/24
Logical design	5 days	Sat 18/5/24	Wed 22/5/24
Implementation	**23 days**	**Wed 22/5/24**	**Thu 13/6/24**
SQL statement	12 days	Wed 22/5/24	Sun 2/6/24
Inferface design	11 days	Mon 3/6/24	Thu 13/6/24
Prototype	**6 days**	**Fri 14/6/24**	**Wed 19/6/24**
System testing and debugging	5 days	Fri 14/6/24	Tue 18/6/24
Project demonstration	1 day	Wed 19/6/24	Wed 19/6/24



8.0 Benefit and Overall Summary of Proposed System

CampusUnity represents a groundbreaking solution tailored to revolutionize administrative and operational processes within university and college campuses. By unifying resources and functionalities under a single platform, CampusUnity promises a plethora of benefits aimed at enhancing campus-wide efficiency and collaboration.

At its core, CampusUnity offers unparalleled efficiency gains by automating administrative tasks. This automation not only saves valuable time but also frees up staff to focus on strategic initiatives that propel the institution forward. Tasks such as resource allocation, scheduling, and communication are seamlessly integrated, streamlining workflows and optimizing productivity across departments.

Central to CampusUnity's value proposition is its ability to maximize resource utilization. By providing administrators with real-time data and analytics, CampusUnity empowers decision-makers to make informed choices regarding the allocation of campus facilities and personnel. This ensures that resources are utilized to their fullest potential, ultimately driving cost savings and operational excellence.

Furthermore, CampusUnity serves as a catalyst for improved communication and collaboration across the campus community. Through centralized communication channels and intuitive features such as notifications and messaging, CampusUnity fosters connectivity among departments, faculty, staff, and students. This enhanced communication infrastructure facilitates seamless collaboration, leading to greater synergy and innovation campus-wide.

Finally, CampusUnity simplifies decision-making processes through its robust suite of integrated functionalities and comprehensive data reporting. Administrators have access to a wealth of actionable insights, enabling them to make data-driven decisions that optimize operations and resource allocation.

In summary, CampusUnity represents more than just a software solution it embodies a vision for a connected and collaborative campus ecosystem. By enhancing efficiency, communication, and decision-making processes, CampusUnity empowers institutions to realize their academic mission with greater impact and effectiveness. Together, let's build a campus united in purpose and driven towards excellence.