Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**
Subject: Capstone Project	**Aim: Innovation and Originality**
Date: 26-9-2025	**Enrolment No: 92310133001**

1. Introduction

- The Galaxy Hostel Management System is designed to address challenges faced in managing student attendance, gate passes, and hostel-related communications in a seamless digital environment. Unlike traditional manual methods or basic attendance apps, this project introduces real-time face recognition, automated reporting, and integrated hostel services in a single platform. The system combines modern web technologies with cloud services to improve efficiency, security, and user experience for both students and wardens.

2. Novel Approach

❖ Real-Time Attendance Capture:

- Instead of manually marking attendance or uploading images, the system uses a live webcam feed to detect and recognize student faces instantly.
- Face data is securely stored and processed using Firebase, reducing manual intervention and errors.

❖ Integrated Hostel Services:

- The system consolidates multiple functions—attendance tracking, gate pass management, and complaint handling—into one centralized platform.
- Students can apply for gate passes and lodge complaints digitally, while wardens can manage approvals and monitor activity through a dashboard.

❖ Automated Reporting:

- Attendance and gate pass data are automatically compiled into downloadable Excel/PDF reports, eliminating repetitive manual work.
- The system maintains historical records and provides analytics on attendance trends, helping wardens make informed decisions.

❖ Modular and Scalable Design:

- Built with Next.js, TailwindCSS, Firebase, and modular code structure for easy maintenance and future enhancements.
- Cloud functions ensure the system can scale to accommodate large hostels with multiple floors and hundreds of students.

Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**
Subject: Capstone Project	**Aim: Innovation and Originality**
Date: 26-9-2025	**Enrolment No: 92310133001**

3. Comparison with Existing Solutions

- Existing attendance systems mostly rely on manual entry, RFID cards, or simple image uploads, which are time-consuming and error-prone.
- Other hostel management apps focus only on basic record keeping without real-time attendance or integrated services.
- Galaxy Hostel System stands out because it combines live face recognition, automated reporting, and hostel management into a single platform.
- Compared to traditional methods, the system is more efficient, secure, and user-friendly, reducing workload for wardens and improving transparency for students.

4. Contribution to ICT Field

- Advances in Cloud-Based Solutions: Demonstrates how serverless cloud functions can handle real-time image processing and data management efficiently.
- Practical Application of Face Recognition: Shows the use of face recognition technology in real-world scenarios like hostel attendance, which can be extended to schools, offices, or other institutions.
- Improved User Experience and Automation: Reduces manual effort, improves operational efficiency, and provides a model for integrating multiple services in a single platform.
- Future Research and Development: The project can serve as a foundation for AI-enhanced campus management, predictive analytics for student behavior, or advanced security implementations in institutional environments.

5. Enhanced Security and Privacy

- Role-Based Access Control: Students, wardens, and admins have different access levels to ensure data privacy.
- Secure Data Storage: All sensitive data (student photos, personal details) is stored securely in Firebase with access rules.
- HTTPS Communication: All data transferred between frontend and backend is encrypted to prevent unauthorized access.

Marwadi University Marwadi Chandarana Group	**Marwadi University** **Faculty of Engineering and Technology** **Department of Information and Communication Technology**
Subject: Capstone Project	**Aim: Innovation and Originality**
Date: 26-9-2025	**Enrolment No: 92310133001**

6. Real-Time Analytics and Insights

- Live Attendance Dashboard: Wardens can view attendance in real time, including statistics by floor or room.
- Trend Analysis: The system provides charts for attendance patterns, absenteeism rates, and student participation.
- Data-Driven Decisions: Helps hostel management identify issues early, such as students frequently absent or gate pass misuse.

7. Customizability and Extensibility

- Modular Design: New modules (e.g., mess feedback, hostel events, student notices) can be easily added without affecting the core system.
- Configurable Rules: Admins can set attendance thresholds, gate pass limits, and notification preferences.
- Future AI Enhancements: The system is prepared for potential AI features, such as predictive alerts for absenteeism or automated anomaly detection.

8. Improved User Experience

- Intuitive Interface: The frontend is designed with Next.js and TailwindCSS to provide a simple and responsive user interface for students and wardens.
- Quick Access to Services: Students can request gate passes, submit complaints, and view attendance without needing to visit the warden physically.
- Notifications & Alerts: Real-time notifications inform students and wardens of approvals, absences, or rule violations, reducing miscommunication.

9. Cost-Effective and Scalable Solution

- Cloud-Based Architecture: Using Firebase and Vercel serverless functions reduces the need for dedicated servers and lowers infrastructure costs.

- Automatic Scaling: The system handles multiple users and classrooms without performance degradation, supporting large hostels efficiently.

- Maintenance Efficiency: Modular and serverless design reduces the effort required for updates, bug fixes, and adding new features.