	INDIAN INSTITUTE OF TECHNOLOGY BOMBAY **MATERIALS MANAGEMENT DIVISION** **Powai, Mumbai 400076.**

Ref. PR No. 1000055837 **Rfx. No. 6100003028**

Technical Specification of Design, Development, Deployment and Maintenance of ERPNext/Frappe-based Student ID Card Access Monitoring & Analytics Platform at IIT Bombay

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Indian Institute of Technology Bombay (IIT Bombay) invites sealed bids under a **two-bid system (Technical Bid and Commercial Bid)** from eligible bidders for the **design, development, deployment, integration, and maintenance** of an ERPNext/Frappe-based software platform for student ID card-based access monitoring and analytics.

The system shall be integrated with the Institute's RFID-based access control infrastructure and shall be deployed on IIT Bombay servers.

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1. INTRODUCTION AND OBJECTIVE

IIT Bombay is in the process of implementing an RFID-based Student ID Card system to enable secure and traceable access across hostels, classrooms, and campus facilities. In order to derive meaningful insights and enable operational decision-making, the Institute proposes to implement a **software platform built on ERPNext/Frappe.**

The objective of this tender is to onboard a competent agency for:

- Designing and developing a scalable software platform
- Integrating the platform with RFID hardware systems
- Enabling real-time data capture, processing, and visualization
- Providing dashboards, analytics, and reporting capabilities
- Ensuring maintainability, extensibility, and Institute ownership of the solution

The selected bidder shall deliver a **fully functional, integrated system** in accordance with the scope and timelines defined in this document.

2. PRE-QUALIFICATION CRITERIA

Bidders must meet the following eligibility criteria:

2.1 The bidder shall be a registered company/firm in India and shall have been in operation for a minimum of **three (3) years**. (Certificate of Incorporation/Registration)

2.2 The bidder shall have an average annual turnover of at least **₹40 Lakhs** in the last three financial years. (Audited Financial Statements / CA Certificate for last three years)

2.3 The bidder shall have demonstrable experience in **ERPNext/Frappe-based application development and deployment**.

2.4 The Bidder should have an office and a development centre in India. The operational presence of an office in Mumbai or within the radius of 200 kms is mandatory.
(Address proof for the registered company)

2.5 The bidder shall have a technically qualified team with experience in:

- ERPNext/Frappe development
- Integration with other databases and systems
- Web-based dashboards and analytics systems

2.6 The bidder shall have the capability to provide **on-site support at IIT Bombay** when required.

2.7 The bidder shall submit evidence in support of the above along with the Technical Bid.

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3. GENERAL TERMS AND CONDITIONS

3.1 The system shall be developed on **ERPNext/Frappe (version 15 or higher)**.

3.2 The solution shall be deployed on **IIT Bombay Hardware infrastructure**, and no vendor-hosted solution shall be permitted.

3.3 The bidder shall ensure seamless integration with the RFID-based access control system being procured by the Institute.

3.4 The bidder shall provide **complete access to source code**, database

schema, and configuration, along with all technical documentation.

3.5 The solution shall not rely on proprietary components that restrict future modifications or integration.

3.6 All deliverables shall be subject to acceptance by IIT Bombay based on defined functional and performance criteria.

3.7 The bidder shall act as the **single point of responsibility** for the complete software solution, including integration, stabilization and support for operational issues.

3.8 The successful bidder shall submit a Performance Bank Guarantee (PBG) of 5% of contract value, valid for the total contract duration.

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4. EVALUATION METHODOLOGY (QCBS)

4.1 The selection of the bidder shall be based on the **Quality-cum-Cost Based Selection (QCBS)** method with the following weightage:

- Technical Score (TS): 70%
- Commercial Score (CS): 30%

4.2 Technical Evaluation

The Technical Evaluation shall be carried out based on the following criteria:

Sr. No.	Criteria	Marks
1.	**Experience in ERPNext/Frappe projects** [<1 year : 5 marks] [1 year - 3 years: 15 marks] [> 3 years : 25 marks]	25
2.	**Experience in similar systems (attendance / analytics / campus systems)** [<=2 projects: 5 marks] [3-5 projects: 10 marks]	15

	[>5 projects: 15 marks]	
3.	**30-minute presentation before the Expert Committee covering the following aspects:** 30 A] Proposed solution architecture and integration approach	20
	B] Methodology, work plan, and implementation timeline	10
4.	**Key Personnel and Team Capability for this Assignment** Relevant work experience of the proposed implementation team leads and the strength/capability of the team proposed specifically for this assignment (CVs/details to be attached). - [Team lead experience ≤ 2 year and proposed team strength below 10 personnel: 5 Marks] - [Team lead experience > 2 year to ≤ 4 years and proposed team strength between 10–15 personnel: 15 Marks] - [Team lead experience > 4 years and proposed team strength between 15–20 personnel with relevant implementation experience: 20 Marks]	20
5.	**Experience of projects handling of Central & State Government Departments/PSU/Educational Institutes** [Number of relevant projects:] [<=2 projects: 5 marks] [>2 projects: 10 marks]	10
Total		**100**

The presentation shall be used for evaluating the proposed solution architecture, integration approach, methodology, and implementation timeline. Only bidders securing **60% or more marks** in Technical Evaluation shall qualify for opening of the Commercial Bid.

4.3 Final Selection

The final score shall be computed as:

Total Score = (70 × TS / HTS) + (30 × LCB / CB)

Where:

- TS = Technical Score of bidder
- HTS = Highest Technical Score
- CB = Commercial Bid of bidder
- LCB = Lowest Commercial Bid

The bidder obtaining the highest combined score shall be considered for award of contract.

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5. SCOPE OF WORK

The scope of work is divided into **Phase 1** and **Phase 2** for implementation and milestone tracking purposes. Both phases form part of the required scope of work under this tender, and bidders shall quote for the complete scope covering both phases.

5.1 Phase 1

Under Phase 1, the selected bidder shall design, develop, deploy, and commission a fully functional ERPNext/Frappe-based software platform that integrates with the Institute's RFID-based Student ID Card system and enables real-time access monitoring, attendance tracking, and operational visibility across campus facilities. The Phase 1 deliverables shall be completed within **8 weeks from date of Purchase Order**.

The scope of Phase 1 shall include the following defined deliverables. The bidder shall ensure completion of all Phase 1 deliverables within the stipulated timeline.

5.1.1 Integration with RFID-based Access Control System

The bidder shall design and implement a robust integration layer between the software platform and the RFID hardware infrastructure, including card readers and turnstile systems being deployed across the Institute.

The system shall capture all access events generated through card taps, including user identity, timestamp, and location/device identifier. The integration shall support near real-time data ingestion through standard, secure, and documented data exchange mechanisms approved by IIT Bombay, ensuring reliable and continuous data flow from the hardware layer to the software platform.

The bidder shall be responsible for validating data integrity, handling duplicate or erroneous events, and ensuring that the integration is scalable and resilient under high transaction volumes.

5.1.2 Hostel Access Monitoring and Presence Tracking

The system shall provide comprehensive monitoring of student movement in and out of hostels. Based on RFID-based entry and exit logs, the system shall compute and display the current presence status of students within hostel premises.

The platform shall enable authorized users (such as wardens and administrative staff) to view:

- Real-time presence status of students at hostel and building levels
- Historical movement logs of individual students
- Duration of stay within hostel premises over configurable time periods

The system shall support filtering, search, and visualization capabilities to facilitate monitoring and operational decision-making.

5.1.3 Classroom Attendance Management

The system shall enable automated attendance tracking based on RFID-based entry and exit events recorded at classroom or lecture hall access points.

The bidder shall design logic to derive attendance status using entry/exit timestamps and configurable rules (e.g., minimum duration thresholds, valid entry windows). The system shall also include mechanisms to identify anomalies such as proxy attendance or irregular patterns.

Attendance data shall be made available to authorized faculty and administrators through dashboards and reports. The system shall support export of attendance records and integration with other academic systems, if required.

5.1.4 Facility Usage Monitoring

The platform shall track and analyze usage of key campus facilities such as libraries, gymkhana, and other common areas where RFID access points are installed.

The system shall capture:

- Number of users accessing each facility
- Time spent within the facility
- Peak usage periods

The bidder shall provide dashboards and reports that enable Institute authorities to understand utilization patterns and optimize resource allocation.

5.1.5 Student Non-Academic Database Module

The bidder shall design and implement a structured database of non-academic information to work with the ERPNext/ Frappe framework seamlessly and support data analysis and visualization.

This module shall include, but not be limited to:

- Basic student profile information
- Verified contact details (including parent/guardian information)
- Hostel and room allocation history
- Participation in extracurricular activities and positions of responsibility
- Other administrative attributes as required by the Institute

The module shall support data entry, validation, updates, and retrieval through role-based access controls.

5.1.6 Role-Based Dashboards and User Interfaces

The system shall provide configurable dashboards tailored to different user roles, including but not limited to:

- Dean SA and senior administrators

- Wardens
- Security personnel
- Faculty (for attendance-related views)

Dashboards shall present relevant data in the form of summaries, charts, and tables, enabling users to quickly assess operational status and trends.

The system shall allow customization of views and reports, subject to appropriate access permissions.

5.1.7 Notification and Alerting System

The platform shall include a notification framework capable of generating alerts and communications based on defined events and conditions.

Notifications may include:

- Attendance-related alerts
- Irregular access patterns
- Administrative announcements

The system shall support delivery through email and other digital channels supported within ERPNext/Frappe. Notifications shall be configurable based on user roles and event types.

5.1.8 Framework for Integration

The bidder shall design and implement a comprehensive integration framework to enable secure exchange of data between the proposed platform, the RFID-based hardware system, and other institutional systems as required by IIT Bombay. The framework shall support data extraction from relevant databases/tables, as well as structured data exchange through APIs or other standard mechanisms approved by IIT Bombay. The framework should satisfy the basic requirement of data extraction from other databases and tables. It shall:

- Provide access to processed and raw access data
- Support real-time and batch data retrieval
- Provide standard, secure and documented data exchange mechanisms, with structured data formats, as approved by IIT Bombay.

The integration framework documentation shall be provided as part of deliverable.

5.1.9 Deployment, Testing, and Commissioning

The bidder shall deploy the system on IIT Bombay servers and carry out complete configuration and setup.

The bidder shall conduct:

- Functional testing of all modules
- Integration testing with RFID hardware systems
- User Acceptance Testing (UAT) in coordination with IIT Bombay

The system shall be considered accepted only upon successful completion of UAT and formal sign-off by the Institute. Final acceptance shall be subject to certification by IIT Bombay based on successful completion of UAT and verification of all functional requirements.

5.1.10 Documentation and Training

The bidder shall provide comprehensive documentation, including:

- System architecture and design documents
- Configuration and deployment manuals
- Integration framework documentation
- User manuals

The bidder shall also conduct training sessions for relevant IIT Bombay personnel to ensure effective usage and basic system administration.

5.2 Phase 2

Phase 2 shall comprise advanced and value-added capabilities that build upon the core platform implemented in Phase 1. The deadline for executing Phase 2 is **within 6 weeks after completion of Phase 1**.

The scope of Phase 2 shall include the following defined deliverables. Any refinements or prioritization within these deliverables shall be finalized by IIT Bombay during implementation, without altering the overall scope of work. Phase 2 implementation shall commence only after

Phase 1 deliverables are stabilized and acceptance is provided by IITB.

5.2.1 Advanced Analytics and Reporting

The bidder shall enhance the platform to provide advanced analytics capabilities over the data captured through the RFID-based access system.

The system shall support:

- Aggregated analysis of student movement across hostels, classrooms, and facilities
- Identification of usage patterns over time (daily, weekly, monthly trends)
- Comparative analysis across different facilities, departments, or user groups
- Generation of detailed reports with configurable parameters

The platform shall provide interactive dashboards with graphical representations (charts, heatmaps, trend lines) to enable deeper insights for Institute authorities.

5.2.2 Mobile Application Interface

The bidder shall design and develop a mobile application (or mobile-responsive interface) for key stakeholders, including students and administrators.

The mobile interface shall support:

- Secure login with appropriate authentication mechanisms
- Viewing of personal activity logs (for students)
- Access to notifications and alerts
- Basic dashboard views relevant to the user’s role

The application shall be compatible with major mobile platforms (Android and iOS) or accessible through standard mobile web interfaces, as approved by IIT Bombay.

5.2.3 Enhanced Notification and Communication Capabilities

Building upon the notification framework implemented in Phase 1, the bidder shall enhance the system to support:

- Configurable notification workflows based on complex conditions
- Group-based and role-based communication
- Scheduled notifications and reminders
- Escalation mechanisms for critical alerts

The system shall support integration with additional communication channels, subject to Institute approval.

5.2.4 Extended Integration Capabilities

The bidder shall extend the framework to support deeper integration with other institutional systems, as identified by IIT Bombay.

This may include:

- Integration with academic systems for attendance reconciliation
- Integration with administrative systems for reporting and compliance
- Provision of framework for data exchange and interoperability

All integrations shall adhere to standard protocols and security practices, and shall be documented comprehensively.

5.2.5 System Optimization and Scalability Enhancements

The bidder shall undertake enhancements to improve system performance, scalability, and usability based on feedback from Phase 1 deployment.

This shall include:

- Optimization of data processing and query performance
- Enhancements to user interface and user experience
- Improvements in system responsiveness under increased load

The system shall be designed to scale to additional users, devices, and use cases without degradation in performance.

5.2.6 Execution and Acceptance

All deliverables under Phase 2 shall be subject to testing, validation, and formal acceptance by IIT Bombay, in line with the procedures defined for Phase 1.

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6. PAYMENT TERMS (MILESTONE-BASED)

Payments shall be released upon successful completion and acceptance of milestones:

1: Implementation of ERPNext

- Requirement finalization and system design – 10%
- Phase 1 development completion – 15%
- Phase 1 deployment and UAT sign-off – 15%
- Phase 1 Final integration and go-live – 15%
- Phase 2 development – 20%
- Phase 2 Final integration and go-live – 10%
- Documentation and source code handover – 10%
- Post go-live support (one year) – 5%

2: AMC support (2 years) payable on a quarterly basis

All payments shall be subject to certification by IIT Bombay. The above milestone payments shall constitute 100% of the implementation cost. In addition, bidders shall quote AMC support for two years separately as per Annexure II. The AMC support shall commence after post Go-Live support of one year. The AMC cost shall be included for commercial evaluation and shall be payable quarterly after completion of the post-go-live support period, subject to satisfactory service certification by IIT Bombay.

7. SERVICE LEVEL AGREEMENT (SLA)

7.1 Definition of Severity Levels

For the purpose of service level compliance, incidents shall be categorized as follows:

Critical:
Any failure that results in complete or near-complete unavailability of the system or its core functionalities, including but not limited to:

- System not accessible to users
- Failure of integration with RFID system leading to non-availability of access data
- Inability to capture or process real-time access events

Such incidents shall be treated with highest priority and require immediate response and resolution.

High:
Any issue that significantly impacts key functionalities but does not result in complete system failure, including:

- Failure of major modules such as attendance tracking or dashboard visibility
- Partial data unavailability or delayed data updates
- Issues affecting multiple users or locations

Medium:
Issues that affect specific functionalities or a limited set of users, including:

- Errors in reports or dashboards
- Minor delays in data processing
- Non-critical feature malfunction

Low:
Minor issues that do not impact core system functionality, including:

- Cosmetic or user interface issues
- Minor configuration adjustments
- Enhancement requests or low-impact defects

The final classification of incident severity shall be determined by IIT Bombay.

7.2 Response Times

The bidder shall adhere to the following service levels:

Priority	Response Time	Resolution Time
Critical	Within 1 hour	Within 4 hours
High	Within 4 hours	Within 1 calendar day
Medium	Within 1 working day	Within 3 working days
Low	Within 2 working days	Within 5 working days

7.3 System Availability

The bidder shall ensure a minimum **system uptime of 99% on a monthly basis**, excluding scheduled maintenance approved by IIT Bombay. Uptime is defined as 100 x (total available hours / total operating hours)

Any downtime impacting:

- Data capture from RFID systems
- Interfacing availability
- Dashboard access

shall be considered for SLA evaluation.

7.4 Incident Logging and Reporting

The bidder shall maintain a log of all incidents including:

- Time of occurrence
- Severity classification
- Response and resolution timelines
- Root cause analysis

Monthly SLA reports shall be submitted to IIT Bombay in post go-live and AMC durations.

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8. INTELLECTUAL PROPERTY RIGHTS

8.1 The complete source code, configurations, customizations, scripts, workflows, reports, dashboards, integration components, documentation, and all project-specific deliverables developed under this tender shall be the property of IIT Bombay, subject to applicable open-source licenses of ERPNext/Frappe and any approved third-party components.

8.2 IIT Bombay shall have the right to use, modify, extend, maintain, enhance, and integrate the developed system for its internal institutional purposes without requiring any additional permission from the bidder.

8.3 The bidder shall provide IIT Bombay with complete access to the source code, database schema, configuration files, deployment scripts, integration documentation, Integration framework documentation, and all relevant technical and user documentation required for ongoing maintenance and enhancement of the system.

8.4 The bidder shall not impose any proprietary restrictions, recurring license conditions, or technical lock-in that prevents IIT Bombay from maintaining, modifying, or extending the developed system.

8.5 Any third-party libraries, tools, plugins, proprietary components, or licensed software proposed to be used in the system shall be clearly disclosed by the bidder in the Technical Bid and shall be used only with prior approval of IIT Bombay. Any associated license cost shall be clearly indicated in the Commercial Bid.

8.6 The bidder shall ensure proper knowledge transfer to IIT Bombay's designated technical team, including walkthroughs of the codebase, configuration, deployment process, integration mechanisms, and maintenance procedures.

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9. PENALTIES AND SLA ENFORCEMENT

9.1 Delay in Milestone Delivery

Any delay in completion of defined milestones shall attract a penalty of:

- **0.5% of milestone value per week of delay**,
- Subject to a maximum of **10% of the total Implementation Cost**.

Repeated breach of response or resolution timelines shall be treated as SLA non-

compliance and may be considered while certifying AMC/post-go-live support payments.
In addition, IIT Bombay reserves the right to forfeit PBG for breach of any terms and conditions of contract.

9.2 Uptime Violation

If monthly uptime falls below 99%, penalties shall apply:

- 98% – 99%: 2% of AMC quarterly payment
- 95% – 98%: 5% of AMC quarterly payment
- Below 95%: 10% of AMC quarterly payment

9.3 Persistent Non-Compliance

In case of:

- Repeated Critical SLA violations, or
- Failure to meet SLA for **three consecutive**

months, IIT Bombay reserves the right to:

- Invoke contract termination
- Recover damages
- Debar the bidder as per Institute norms
- Forfeit the PBG

9.4 Recovery Mechanism

All penalties shall be:

- Deducted from pending payments

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10. DELIVERABLES

The bidder shall deliver:

- Fully functional ERPNext/Frappe-based system
- Integration with RFID hardware system (Hardware shall be within the scope of IITB)
- Source code and technical documentation
- Integration framework documentation
- User manuals and training materials
- Training sessions for IIT Bombay personnel
- Monthly SLA reports after Go-Live of Phase 2

ANNEXURES

- Annexure 1 – Commercial Bid Format
- Annexure 2 – Declaration
- Annexure 3 – Document Checklist
- Annexure 4– Functional Specifications

TECHNICAL COMPLIANCE SHEET

(To be filled by the bidder and submitted along with the Technical Bid)

Sr. No.	Requirement	Compliance (Yes/No)	Remarks / Reference
1	Proposed solution is based on ERPNext/Frappe (v15 or higher)		
2	Solution can be deployed on IIT Bombay servers		
3	Solution supports integration with RFID hardware systems		
4	System supports real-time data ingestion and processing at a rate up to 10 lakh transactions per day		
5	System supports hostel access monitoring		
6	System supports classroom attendance tracking		
7	System supports facility usage monitoring		
8	System supports configurable dashboards		
9	System supports role-based access control		
10	System supports notification and alert mechanisms		

11	System provides integration capabilities		
12	Standard, secure and documented data exchange mechanisms, with structured data formats, as approved by IIT Bombay.		
13	System supports audit logging and traceability		
14	System supports scalability and future extensibility		
15	Source code and documentation shall be handed over to IIT Bombay		
16	System supports deployment on Institute-managed infrastructure		
17	Mobile compatibility / responsive interface supported		
18	SLA requirements accepted		
19	Penalty clauses accepted		
20	All terms and conditions of tender accepted		

ANNEXURE 1

COMMERCIAL BID FORMAT

(To be submitted separately in Commercial Bid envelope)

Sr. No.	Milestone / Deliverable	Amount (INR)
1	Requirement finalization and system design	
2	Phase 1 development completion	
3	Phase 1 deployment and UAT sign-off	
4	Phase 1 Final integration and go-live	
5	Phase 2 development	
6	Phase 2 Final integration and go-live	
7	Documentation and source code handover	
8	Post go-live support	
A	**Total Implementation Cost (sum of 1 to 8)**	
9	AMC Cost for two years	
B	**Grand Total Cost for Commercial Evaluation (A+9)**	

Commercial Bid Notes

1. The quoted price shall be inclusive of:
    - Development
    - Deployment
    - Integration
    - Documentation
    - Training
    - Support
    - Applicable taxes and duties
2. No additional payment shall be made for functionality required for successful completion of the scope of work but not explicitly listed above.

ANNEXURE 2

DECLARATION

(To be submitted on bidder's letterhead)

To,
Indian Institute of Technology Bombay
Powai, Mumbai – 400076

Subject: Declaration for Tender – ERPNext/Frappe-based Student ID Card Access Monitoring & Analytics Platform

Dear Sir/Madam,

We hereby declare that:

1. We have carefully examined and understood all terms and conditions of the tender document.
2. We agree to comply with all technical, commercial, and contractual requirements specified in the tender.
3. We confirm that the information furnished in our bid is true and correct to the best of our knowledge.
4. We confirm that our organization has not been blacklisted by any Government / PSU / Autonomous Institution.
5. We agree that IIT Bombay reserves the right to accept or reject any bid without assigning any reason.
6. We agree to provide complete source code, documentation, and deployment support as specified in the tender document.
7. We agree to maintain confidentiality of all Institute data and information accessed during the course of the project.

Authorized
Signatory Name:
Designation:
Company
Name: Date:
Seal & Signature

ANNEXURE 3

DOCUMENT CHECKLIST

(To be filled by bidder and submitted along with Technical Bid)

Sr. No.	Document	Submitted (Yes/No)	Page No.
1	Certificate of Incorporation / Registration		
2	PAN Card		
3	GST Registration Certificate		
4	Audited Financial Statements / CA Certificate for last three years		
5	Work Orders / Completion Certificates for Similar Projects		
6	Technical Proposal		
7	Technical Compliance Sheet (Annexure I)		
8	Commercial Bid Format (Annexure II)		
9	Declaration (Annexure III)		
10	Team Structure and Key Personnel Details (CV)		

11	Proposed Architecture / Solution Document		
12	Integration Approach		
13	Company Profile		
14	Non-Blacklisting Declaration		
15	Any Deviations from Tender Conditions		

ANNEXURE 4

FUNCTIONAL SPECIFICATIONS

The proposed ERPNext/Frappe-based platform shall support the following functional requirements:

A. RFID Integration

The system shall support integration with RFID-based access control hardware including:

- Card readers
- Turnstiles
- Controller system

The system shall capture:

- User identity
- Timestamp
- Location/device identifier

The integration shall support near real-time processing and storage of access events.

B. Hostel Monitoring

The system shall support:

- Real-time hostel presence tracking
- Historical movement logs
- Hostel occupancy analytics
- Configurable reports and dashboards

C. Attendance Management

The system shall support:

- Automated attendance derivation from RFID access events
- Configurable attendance logic
- Attendance dashboards and reports
- Export and integration capabilities

D. Facility Usage Monitoring

The system shall support:

- Monitoring of access to facilities such as libraries, gymkhana, and other common spaces
- Usage analytics and reporting
- Peak utilization analysis

E. Student Information Module

The system shall support:

- Student profile management
- Parent/guardian information
- Hostel allocation details
- Non-academic information management

F. Dashboards and Reporting

The system shall provide:

- Role-based dashboards
- Configurable charts and analytics
- Search and filtering capabilities
- Exportable reports

G. Notification Framework

The system shall support:

- Event-based notifications
- Email alerts
- Administrative announcements
- Configurable notification workflows

H. Integration Framework

The integration framework shall provide:

- Standard, secure and documented data exchange mechanisms, with structured data formats, as approved by IIT Bombay.
- Secure authentication mechanisms
- Integration framework documentation

I. Security and Access Control

The system shall support:

- Role-based access control
- Audit logging
- Secure authentication and authorization
- Data protection mechanisms

J. Scalability and Performance

The system shall:

- Support concurrent users and transactions
- Be scalable for future expansion
- Maintain acceptable performance under load