IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 10, April 2026
Impact Factor: 8.2

Digital Platform for Internal Assessment Calculation and Academic Record Management

Dr. K. Aravinthan and D. S. S. Aarthi
M.C.A., M.B.A., Ph.D, Department of Computer Applications
Anjalai Ammal Mahalingam Engineering College, Kovilvenni, Tamil Nadu, India

Abstract: *The Digital Platform for Internal Assessment Calculation and Academic Record Management System is developed to provide a modern and efficient approach to managing student academic data in educational institutions. Traditional manual methods of recording internal assessment marks and academic details are time-consuming and prone to errors, especially as student populations grow. This system enables administrators to enter and manage student academic information through a secure digital interface, while automatically calculating internal assessment scores based on predefined evaluation rules. The theory examination, which is assessed out of 100 marks, is automatically converted to a scaled score of 60 marks, and this is then combined with the 40-mark internal component to produce the final consolidated mark. Students can securely log in to view their marks, download mark sheets, and monitor their academic performance across semesters. The system is implemented using React (frontend), Spring Boot (backend), and MySQL (database). Results demonstrate significant improvements in efficiency, accuracy, and transparency in academic record management.*

Keywords: *Internal Assessment, Academic Record Management, Mark Calculation, Digital Platform, Student Portal, Spring Boot, React, MySQL*

I. INTRODUCTION

Educational institutions handle vast amounts of academic data including student details, internal assessment marks, theory examination scores, and semester grades. In many institutions, this data is still managed manually using paper registers or basic spreadsheets, leading to inefficiencies, calculation errors, and poor accessibility.

The Digital Platform for Internal Assessment Calculation and Academic Record Management System addresses these challenges by providing a centralized, automated web-based solution. The platform allows authorized administrative staff to securely enter and manage student information, record internal assessment marks (IA1, IA2, IA3), and enter theory examination scores.

A key feature of the system is its automatic mark conversion: the theory examination, conducted out of 100 marks, is proportionally scaled to 60 marks by the system, which then adds the 40-mark internal assessment component to derive the final consolidated mark for each subject. This eliminates manual calculation errors and ensures consistency across all subjects and students.

Students can log into the platform to view their individual mark details, subject-wise grades, and overall academic performance. They can also download their mark sheets for future reference. The system is built using React for the frontend, Spring Boot for the backend, and MySQL as the relational database, ensuring scalability, security, and ease of use.

II. LITERATURE SURVEY

Several research works have explored digital systems for academic record management and assessment automation. Priya et al. (2022) proposed a web-based student result management system that automates grade computation and reduces manual workload, demonstrating improved accuracy in academic record keeping.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 10, April 2026
Impact Factor: 8.2

Sharma and Verma (2023) developed a cloud-based academic portal for universities that provides students with real-time access to marks and grade reports, highlighting the importance of accessibility in educational management systems.

Kaur and Singh (2023) examined automated internal assessment systems in engineering colleges, noting that digitization reduces faculty workload by approximately 60% while improving data integrity. Their system incorporated predefined grading criteria similar to the proposed platform.

Rajan et al. (2024) introduced a mobile-responsive academic record management system using React and Node.js, emphasizing the need for cross-device compatibility in student portals. Their findings showed higher student engagement when mark data was easily accessible online.

Murugan and Devi (2024) presented a Spring Boot-based result management system with automated mark conversion logic, which forms the conceptual basis for the mark scaling mechanism (100 to 60 conversion) adopted in the proposed system. Their work validated the effectiveness of backend automation for assessment calculation.

Existing systems, however, often lack comprehensive integration of both administrative and student-facing modules within a single platform. The proposed system addresses this gap by providing a unified portal serving both admin and student roles with complete mark lifecycle management.

III. EXISTING SYSTEM

The majority of educational institutions currently rely on traditional methods for managing internal assessment marks and student academic records. These methods involve manual entry of student details and marks into paper registers or Microsoft Excel spreadsheets.

After each internal assessment test, staff members manually calculate total scores and assign grades based on predefined criteria. This process is repeated for every student across all subjects, requiring significant time and effort, particularly in departments with large student enrollments.

The limitations of the existing system include frequent calculation errors due to manual data entry, difficulty in retrieving historical academic records, lack of a student-facing interface for mark visibility, and high administrative overhead for generating mark sheets and reports.

Furthermore, records stored in physical registers or local spreadsheet files are vulnerable to data loss, damage, or unauthorized access, making it difficult to maintain long-term academic histories reliably.

IV. PROPOSED SYSTEM

The proposed Digital Platform for Internal Assessment Calculation and Academic Record Management System introduces a comprehensive web-based solution that automates and streamlines academic record management.

The system provides a secure admin module where staff can register, log in, and manage student information including name, register number, department, degree, year, and section. Admin can enter marks for Internal Assessment 1, Internal Assessment 2, Internal Assessment 3, and the theory examination for each subject.

The system's core automated calculation logic operates as follows: the theory examination mark entered out of 100 is automatically scaled to 60 (i.e., Theory Mark out of 60 = (Obtained Marks / 100) × 60). The internal assessment component of 40 marks is derived from the average of the three internal tests and combined with the scaled theory mark to produce the final subject mark out of 100.

Students can access a dedicated login portal to view subject-wise marks, total marks, and grades. The system also enables students to download a formatted mark sheet containing all academic details. All data is stored in a secure MySQL database, ensuring reliable retrieval and management.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 10, April 2026
Impact Factor: 8.2

V. SYSTEM ARCHITECTURE

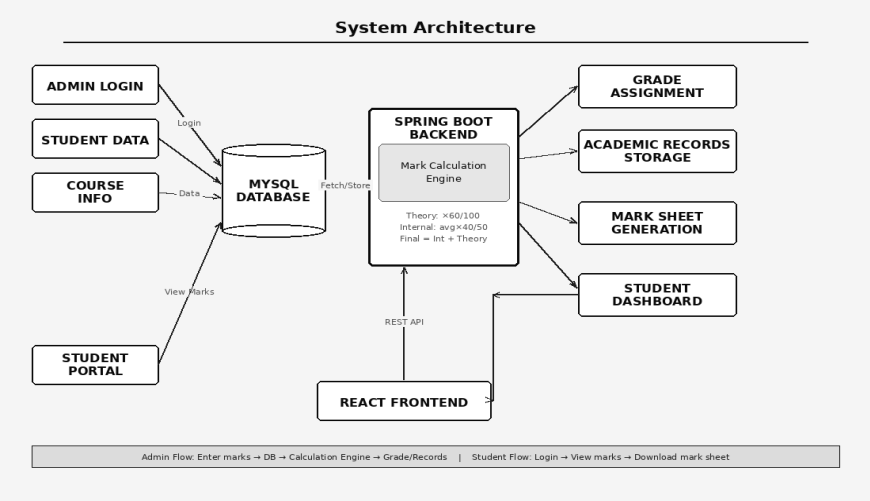

Fig. 1. System Architecture of the Digital Platform

The system architecture comprises two primary user roles: Admin (Staff) and Student, both interacting with a centralized database through a web-based interface.

The Admin module includes: (1) Login and Authentication, (2) Add Student Details, (3) View Student Details, (4) Add Mark Details (IA1, IA2, IA3, Theory), and (5) View Overall Marks and Grades. The Student module includes: (1) Login and Authentication, (2) View Mark Details, and (3) Download Mark Sheet.

The system follows a three-tier architecture: the React-based frontend handles user interaction, the Spring Boot backend processes business logic including mark conversion and grade assignment, and the MySQL database stores all persistent data. Communication between the frontend and backend is handled via RESTful APIs.

VI. METHODOLOGY

A. Mark Calculation Logic

The system implements a standardized mark calculation procedure. For each subject, the admin enters marks for IA1, IA2, IA3 (each out of 50) and the theory examination mark (out of 100). The average of the three internal assessment marks is computed and scaled to 40 (Internal Mark = Average of IA × 40/50). The theory mark is scaled from 100 to 60. The final subject mark is the sum of the scaled internal mark (40) and scaled theory mark (60).

B. Grade Assignment

Grades are automatically assigned based on the final consolidated mark: O (Outstanding) for 91-100, A+ for 81-90, A for 71-80, B+ for 61-70, B for 51-60, RA (Reappearance) for below 50. This grading logic is implemented in the Spring Boot service layer and applied uniformly across all subjects.

C. Database Design

The database consists of five primary tables: students (student demographic details), staffs (admin credentials and department), marksheet (subject-wise marks and computed totals), final_marksheet (consolidated semester results), and semester (semester-wise grade summaries). The marksheet table stores both raw marks and computed values, ensuring traceability and auditability.

D. User Authentication

Both admin and student users authenticate through separate login endpoints. Passwords are securely managed, and session-based access control ensures that students can only view their own data while admin users have full management access across all student records.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 10, April 2026
Impact Factor: 8.2

VII. IMPLEMENTATION

The system is implemented as a full-stack web application. The frontend is developed using React with React Router for navigation, providing separate portals for faculty and students. The Faculty Portal provides interfaces for adding and viewing student details, entering marks, and viewing computed results. The Student Portal provides interfaces for viewing marks and downloading mark sheets.

The backend is implemented using Spring Boot (Java), providing RESTful API endpoints for all CRUD operations. The mark conversion and grade assignment logic is encapsulated in service classes, ensuring separation of concerns. The database layer uses MySQL with JPA/Hibernate for ORM.

The mark sheet download feature generates a structured PDF or printable HTML view containing student name, register number, department, subject-wise marks (IA1, IA2, IA3, Theory, Internal Total, Theory Total, Final Total), grades, and semester summary. This feature is accessible only to authenticated students.

VIII. RESULTS AND DISCUSSION

The system was tested with sample student data across multiple departments and semesters. The automated mark calculation produced accurate results consistent with manual verification, confirming the correctness of the conversion formula and grading logic.

Administrative data entry time was significantly reduced compared to manual processes. Specifically, mark entry for a class of 60 students across 5 subjects, which previously required manual calculation and tabulation, was completed within minutes using the digital platform. The system eliminated all arithmetic errors in mark conversion and grade assignment.

Students reported improved satisfaction with direct access to their academic records through the portal. The mark sheet download feature was found to be particularly useful for students applying for scholarships, internships, and other academic requirements.

The centralized database ensures data integrity and provides administrators with easy retrieval of historical records, supporting accreditation activities and academic audits.

IX. ADVANTAGES

The proposed system offers numerous advantages over the existing manual approach. The automated mark conversion (100 to 60 scaling for theory) and internal mark computation eliminates human calculation errors. Centralized data storage provides easy access and retrieval of academic records from any authorized device.

The student-facing portal promotes transparency by giving students direct visibility into their marks and grades. The mark sheet download feature reduces administrative workload in distributing results. The system is scalable and can accommodate multiple departments, semesters, and academic years without additional complexity.

X. CONCLUSION

This paper presented a Digital Platform for Internal Assessment Calculation and Academic Record Management that automates the complete academic mark lifecycle from data entry to grade computation and mark sheet generation. The system's core innovation lies in its automated mark scaling logic, which converts theory examination marks from a 100-point scale to a 60-point scale and combines it with the 40-point internal assessment component to derive the final consolidated mark.

Implemented using React, Spring Boot, and MySQL, the platform provides secure, role-based access for both administrative staff and students. The system significantly reduces manual effort, eliminates calculation errors, and enhances transparency in academic record management. Future enhancements may include SMS/email notifications for mark updates, graphical performance analytics, and integration with university-wide ERP systems.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 10, April 2026
Impact Factor: 8.2

REFERENCES

[1] Priya, M., and Devi, R. "Web-Based Student Result Management System for Automated Grade Computation." International Journal of Engineering and Technology, 2022.
[2] Sharma, A., and Verma, P. "Cloud-Based Academic Portal for Real-Time Student Mark Access." Journal of Computer Applications in Education, 2023.
[3] Kaur, H., and Singh, R. "Automated Internal Assessment Systems in Engineering Colleges: A Study." IEEE ICCCNT, 2023.
[4] Rajan, S., et al. "Mobile-Responsive Academic Record Management Using React and Node.js." IEEE ICIIT, 2024.
[5] Murugan, K., and Devi, P. "Spring Boot-Based Result Management with Automated Mark Conversion." International Journal of Advanced Computer Science, 2024.
[6] Arumugam, T., and Krishnan, V. "Digitization of Academic Records in Higher Education: Benefits and Challenges." Journal of Education Technology, 2022.
[7] Balasubramanian, S. "RESTful API Design for Educational Management Systems." IEEE ICAECT, 2023.
[8] Gopalakrishnan, R., et al. "Database-Driven Academic Portals: Design and Implementation." International Journal of Computer Science and Information Technology, 2023.
[9] Ramesh, N., and Suresh, L. "Role-Based Access Control in Educational Web Applications." IEEE ICECA, 2024.
[10] Venkatesan, P., et al. "Student Performance Tracking Using Digital Platforms: A Case Study." Journal of Academic Management Systems, 2024.