PONDICHERRY UNIVERSITY

(A CENTRAL UNIVERSITY)

SCHOOL OF ENGINEERING AND TECHNOLOGY DEPARTMENT OF COMPUTER SCIENCE

M.SC. COMPUTER SCIENCE

SECOND PROJECT REVIEW

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PROJECT TITLE : PU STUDENTSPHERE:CLASSROOM MANAGEMENT APP

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DATE : 07/04/2025

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Project Report

PU Student Sphere – Classroom Management Application

1.ABSTRACT

The PU Student Sphere is an integrated classroom management application designed to streamline and enhance academic interactions between students and teachers at Panjab University. The platform aims to provide a unified digital environment that simplifies essential educational processes such as course registration, assignment submissions, attendance tracking, communication, and exam management.

This application offers separate interfaces for teachers and students, enabling personalized access and functionality. Teachers can create and manage courses, post assignments, mark attendance, and handle student registrations. Students can view available courses, register for them, submit assignments, mark attendance, and receive updates. Additionally, the platform includes features such as a real-time chat module for seamless communication, a dynamic to-do list for deadline tracking, and a resource library for centralized academic materials.

Built using the MERN stack (MongoDB, Express.js, React Native, and Node.js), the application ensures scalability, performance, and responsiveness across devices. Secure authentication and user role management are implemented to maintain data privacy and access control. Furthermore, the system supports notifications and reminders to keep users informed about academic deadlines and events.

The PU Student Sphere not only digitizes routine classroom tasks but also fosters a collaborative academic environment. By integrating multiple educational tools into a single application, it reduces manual workload, minimizes miscommunication, and promotes efficiency in academic management.

2.Introduction

In today’s academic environment, managing classroom activities effectively has become increasingly important due to the growing number of students, the complexity of academic processes, and the need for timely communication between students and faculty. Institutions like Panjab University require digital solutions that not only support day-to-day academic operations but also foster a more organized and connected educational experience.

The idea for this project emerged from observing the gaps in traditional classroom management methods, such as manual attendance registers, offline assignment submissions, lack of structured communication between teachers and students, and the absence of centralized access to academic resources. These limitations often lead to inefficiencies, miscommunication, and increased workload for both students and teachers.

PU Student Sphere aims to address these challenges by offering a platform that bridges these gaps using technology. This project focuses on building a dedicated application that provides students and teachers with tools to manage academic responsibilities through a clean and intuitive interface. By focusing on features such as course registration, assignment handling, attendance tracking, and student-teacher interaction, the system aims to support and simplify various academic processes.

The project is being developed using modern web technologies with an emphasis on real-time communication, role-based access, and a user-friendly design. The core idea is not just to digitize existing processes but to enhance them in a way that improves efficiency and accessibility for all users involved.

3. Existing System

Popular platforms such as Google Classroom, Moodle, and Microsoft Teams offer core functionalities but come with significant drawbacks:

- Currently there exists no internal classroom management system for Pondicherry university
- Limited personalization
- Lack of automated workflows for course registration and attendance
- Fragmented tools for assignments and communication
- Absence of integrated dashboards

These limitations result in inefficient time management, redundant manual processes, and reduced student engagement.

4. Proposed System

PU Student Sphere offers an all-in-one mobile application that includes:

- Course Management: Teachers can create, update, and manage courses.
- Course Registration: Students can register for courses, while teachers can accept or reject requests.
- Assignment Management: Teachers assign tasks, and students submit their work digitally.
- Attendance Tracking: Teachers mark attendance through the app, stored securely in the backend.
- Communication Module: Includes chat features and notifications for real-time updates.
- Exam Scheduler: Enables exam-related updates and viewing results.
- To-Do List: Tracks assignment deadlines and academic events.
- Resource Sharing: Teachers can upload and manage materials for student access.

5. System Analysis

5.1 System Study

The system was designed after analyzing common workflows in academic environments. It aims to reduce repetitive tasks, improve student engagement, and offer real-time visibility into learning activities.

5.2 Literature Survey

Several Learning Management Systems (LMS) were studied:

- Google Classroom: Efficient for assignments but limited in course customization.
- Moodle: Feature-rich but not user-friendly for mobile-first users.
- Canvas LMS: Robust but complex and more suited for large institutions.

PU Student Sphere incorporates the best practices from existing tools while offering a more user-centric mobile interface and flexible management system.

5.3 Software and Hardware Requirements

Software:

- Frontend: React Native (Expo)
- Backend: Node.js with Express
- Database: MongoDB
- Development Tools: Insomnia, Git, VS Code
- Real-Time Communication: WebSockets

Hardware:

- Development machine with minimum 8 GB RAM
- Android or iOS mobile devices for testing
- Internet access for real-time features

6. System Design

6.1 Architecture Overview

The application follows a client-server model:

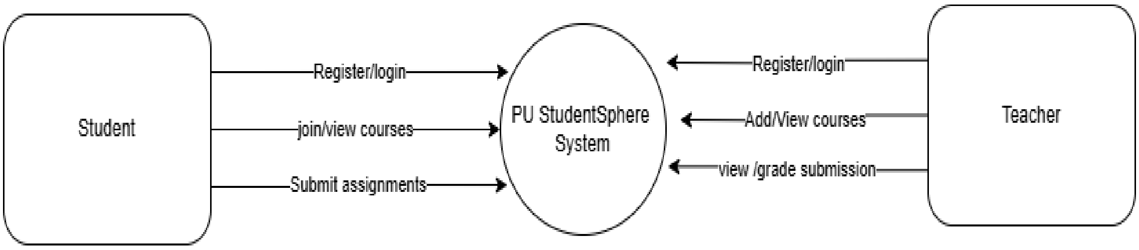
- Frontend (Client): React Native app communicates via REST APIs and WebSockets
- Backend (Server): Node.js with Express handles API logic and database communication
- Database: MongoDB stores structured data (users, assignments, courses, etc.)

6.2 Component-Wise Design

- Authentication System: Validates and manages user sessions with role distinction.
- Course Module: Allows course creation, enrollment, and teacher approvals.
- Assignment Module: Supports assignment upload, review, and grading.
- Attendance Module: Teachers mark attendance and maintain daily logs.
- Chat Module: Real-time interaction between students and teachers using WebSockets.
- Exam Module: View schedules and grades.
- To-Do List: Synchronized with assignments and user-created entries.
- Notification System: Triggered by events and deadlines.

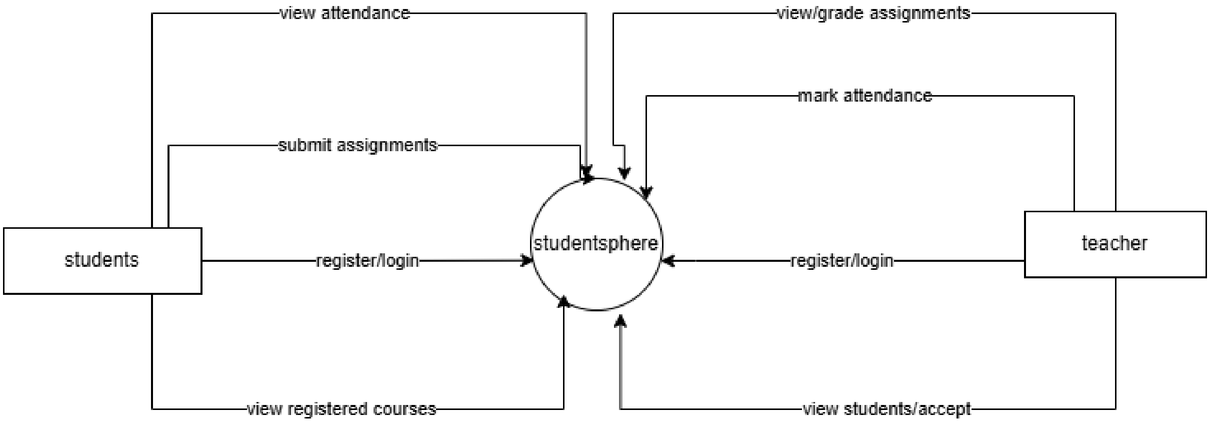
8.3 Data Flow Diagrams (DFDs)

- Level 0 DFD: Represents interactions between users and the PU Student Sphere system.



LEVEL 0 DFD

- Level 1 DFD: Decomposes into login/authentication, course handling, and assignment management.



level 1 DFD

7.Implementation

The implementation of the PU Student Sphere project was carried out in multiple structured phases to ensure modular development and smooth integration of features. The first phase focused on implementing user authentication and role management. This involved creating secure login and registration functionality with role-based navigation for students and teachers. Once completed, the foundation was set for differentiated user experiences.

In the second phase, core academic functionalities such as course creation, management, and student registration were developed. Teachers could create and manage their courses, while students were able to register and request access, forming the backbone of the academic workflow.

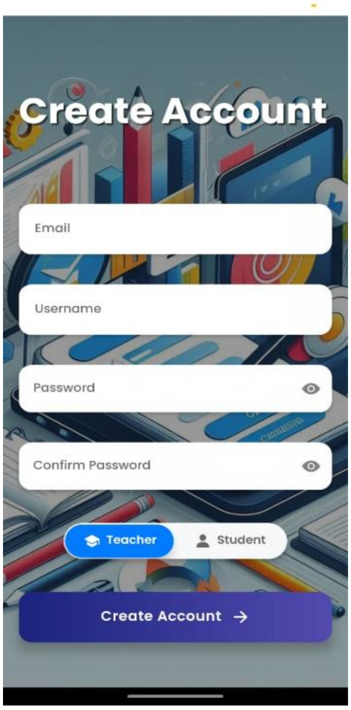
The third phase involved the implementation of the assignment system, enabling teachers to upload assignments and students to submit their work. The system also supported feedback and status tracking for submissions. This module ensured effective assignment handling within the platform.

Phase four, which is currently in progress, focuses on attendance tracking and the notification system. Teachers can mark attendance for each course, and students can view their attendance records. The notification feature aims to keep users informed about important updates like assignment deadlines, registration approvals, and more.

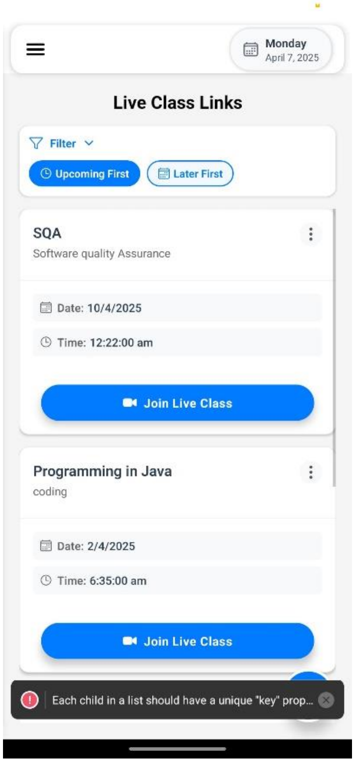
The final phase will involve end-to-end testing of all integrated modules followed by deployment. This phase will focus on performance optimization, bug fixes, and ensuring cross-platform compatibility for real-world usage**.**

12. Screenshots

- Login and Signup Screens



- Live class link



Live Class Links

SQA

Software quality Assurance

Date: 10/4/2025

Time: 12:22:00 am

Programming in Java

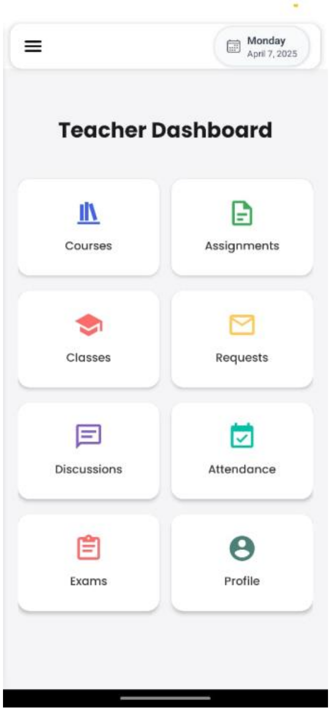
coding

Date: 2/4/2025

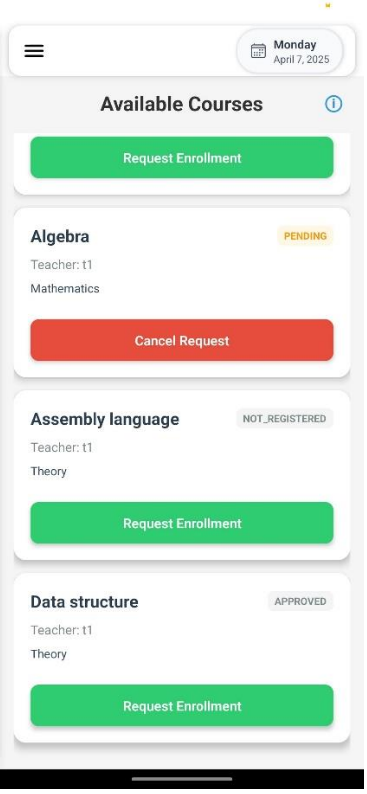
Time: 6:35:00 am

Each child in a list should have a unique "key" prop...

- Teacher Dashboard



- Course List and Registration UI


Monday
April 7, 2025

Available Courses

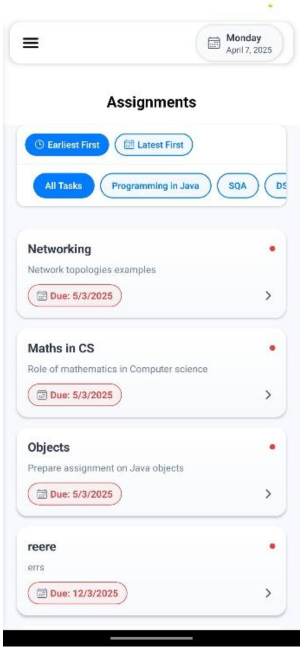
Algebra PENDING
Teacher: t1
Mathematics

Assembly language NOT_REGISTERED
Teacher: t1
Theory

Data structure APPROVED
Teacher: t1
Theory

I

- Assignment Submission Interface



Assignments

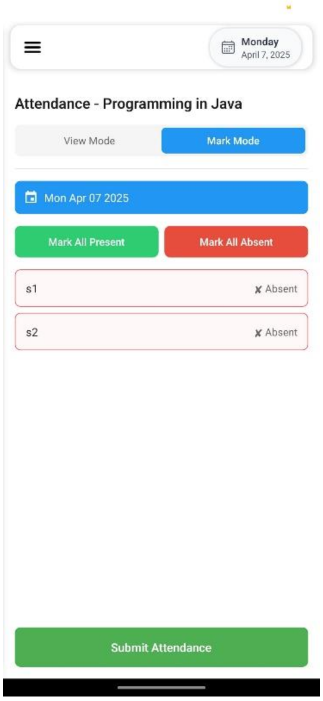
Networking
Network topologies examples
Due: 5/3/2025

Maths in CS
Role of mathematics in Computer science
Due: 5/3/2025

Objects
Prepare assignment on Java objects
Due: 5/3/2025

reere
errs
Due: 12/3/2025

- Attendance Marking Screen

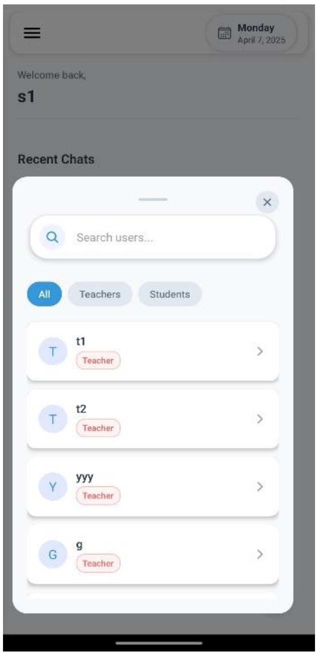


Attendance - Programming in Java

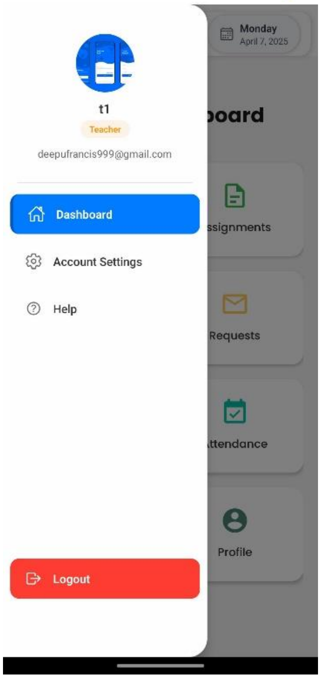
Mon Apr 07 2025

s1	✘ Absent
s2	✘ Absent

- Real-Time Chat Window



- Menu drawer



13. Coding Samples

Selected code snippets from:

- Express API routes (e.g., POST /assignments, GET /courses)
- MongoDB Mongoose models (e.g., User, Course, Assignment)
- React Native UI components
- Routing logic using Expo Router

14.Experimental Results

The PU Student Sphere application was thoroughly tested to ensure all modules function correctly and provide a smooth user experience. Testing was conducted on both the backend APIs and the frontend mobile application. Key results include:

A. Backend API Testing with Insomnia

All backend APIs for authentication, course management, assignments, attendance, and messaging were tested using Insomnia. The endpoints responded accurately with proper status codes, validated input data, and handled errors effectively.

B. Assignment Handling

Teachers could upload assignments and provide feedback. Students were able to view tasks and upload submissions in multiple file formats. The system correctly linked submissions to users and allowed feedback to be viewed by students.

C. Attendance and Course Registration

Teachers successfully marked attendance for multiple courses, and students were able to track their records. Course registration was tested with multiple users to ensure correct handling of registration requests and course enrollment.

D. Frontend Testing on Android Devices

The mobile application was tested on Android devices for responsiveness and UI consistency. All modules, including dashboard navigation, course views, and chat, were responsive and functional. The user interface adapted well to different screen sizes and roles.

15. Conclusion

PU Student Sphere is a robust mobile-based academic platform that integrates essential learning functionalities into a single, user-friendly application. It simplifies academic management for students and educators by bringing automation, structure, and real-time interaction into everyday academic tasks. The successful completion of core modules establishes a strong foundation for further scaling and development.