

CE Department Management System - Project Report

Date: 2025-06-22

1. Introduction

This project is a software solution for the Computer Engineering Department designed to manage core operations including student personal information, fee payments, course enrollment, and staff assignments. The system consists of a backend PostgreSQL database and a frontend web interface developed with Next.js 14.

2. Database Design

The PostgreSQL database contains the following main tables:

- students
- lecturers
- teaching_assistants
- courses
- course_enrollments
- payments
- lecturer_course
- lecturer_ta

Relationships are established through foreign keys to maintain referential integrity. A function was implemented to calculate outstanding student fees and return the result as a JSON array.

3. Frontend Application

The web application was built using Next.js 14 and includes features such as:

- User registration and login

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- Dashboard views for different users
- RESTful API endpoints to interact with the database

Tailwind CSS is used for styling, and authentication is handled via session-based logic.

4. Sample Data

The database is pre-populated with data based on the class of the student developer. Sample entries include students, courses, payments, and TA/lecturer assignments.

5. Running the Application

To set up the project:

1. Clone the GitHub repository
2. Navigate to the frontend directory and run:
 - `pnpm install`
 - `cp .env.example .env`
 - `pnpm dev`
3. Set up the PostgreSQL database by running:
 - `psql -d cpen_db -f db/full_setup.sql`
4. Or restore from backup:
 - `gunzip -c backup/db_dump_2025-06-22.sql.gz | psql cpen_db`

6. Conclusion

This project demonstrates the integration of a relational database with a full-stack web application. It

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addresses the basic operational needs of an academic department and provides a foundation for future expansion.