

University Course Management System - Scenario

Story

The University of Technology wants to implement a database system to manage its courses, students, instructors, and enrollments. Here's how the system currently works:

Students:

- Each student has a unique Student ID, full name, email address, phone number, date of birth, and major (e.g., Computer Science, Mathematics, Physics).
- Students can enroll in multiple courses each semester.

Instructors:

- Each instructor has a unique Instructor ID, full name, email address, phone number, department they belong to (e.g., CS Department, Math Department), and their office location (building and room number).
- Instructors can teach multiple courses.

Courses:

- Each course has a unique Course Code (e.g., CS101, MATH201), course title, number of credit hours, department offering the course, and a description.
- Each course is assigned to one instructor who teaches it.
- Courses are offered in different semesters (Fall, Spring, Summer) and years (e.g., 2024, 2025).

Enrollments:

- When a student enrolls in a course, the system records:
 - The student's information
 - The course information
 - The instructor teaching that course
 - The semester and year
 - The enrollment date
 - The final grade received (A, B, C, D, F, or NULL if not yet completed)
 - The number of credit hours for that course

Current Issues: The university has been storing all this information in a single table, which has led to several problems:

- When updating a course's credit hours, they have to update multiple rows
- If a student drops all courses, their information might be lost
- If an instructor changes departments, multiple records need updating
- Course information is repeated for every student enrollment

Business Rules

1. A student can enroll in multiple courses

2. A course can have multiple students enrolled
3. Each course is taught by exactly one instructor
4. An instructor can teach multiple courses
5. Each enrollment is for a specific semester and year
6. A student can enroll in the same course multiple times (retaking a course)
7. Grades are assigned per enrollment (student + course + semester combination)
8. Course credit hours are fixed per course, not per enrollment

Sample Data Requirements

We need to track:

- At least 5-10 students
- At least 3-5 instructors
- At least 5-8 different courses
- At least 15-20 enrollment records across different semesters
- Some students should have multiple enrollments
- Some courses should have multiple students
- Include some completed courses (with grades) and some in-progress courses (no grades yet)