**Student Course Management System**

This Student Course Management System uses a relational database structure to manage students, courses, enrollments, and instructors. It follows best practices in normalization and data integrity and supports flexible assignment of students and instructors to courses.

**Entities and Their Relationships**

**1. Students**

* Uniquely identified by StudentID.
* Can enroll in **multiple courses**.
* **Many-to-many relationship** with Courses, managed through the Enrollment table.

**2. Courses**

* Uniquely identified by CourseID.
* Can have **multiple students enrolled** and **multiple instructors assigned**.
* Participates in:
  + **Many-to-many relationship** with Students via Enrollment.
  + **Many-to-many relationship** with Instructors via CourseInstructor.

**3. Instructors**

* Uniquely identified by InstructorID.
* Can **teach multiple courses**.
* Each course can also have **multiple instructors** (e.g., lead and assistant).
* Connected to Courses via the CourseInstructor table.

**4. Enrollment**

* Acts as a **junction table** between Students and Courses.
* Contains:
  + StudentID (FK)
  + CourseID (FK)
  + Additional fields like Grade, EnrollmentDate
* Each record uniquely connects one student to one course.
* Allows tracking performance, grades, and course history.

**5. CourseInstructor**

* Junction table linking Courses and Instructors.
* Contains:
  + CourseID (FK)
  + InstructorID (FK)
* Supports many-to-many relationships:
  + One course can be taught by multiple instructors.
  + One instructor can teach multiple courses.

Summary of Relationships

| **Entity 1** | **Relationship** | **Entity 2** | **Description** |
| --- | --- | --- | --- |
| Student | Many-to-Many | Course | Via Enrollment |
| Instructor | Many-to-Many | Course | Via CourseInstructor |
| Course | One-to-Many | Enrollment | A course can have many enrollments |
| Student | One-to-Many | Enrollment | A student can have many enrollments |
| Course | One-to-Many | CourseInstructor | A course can be assigned to multiple instructors |
| Instructor | One-to-Many | CourseInstructor | An instructor can teach multiple courses |

**Use Case Examples**

* Enroll students in multiple courses
* Assign instructors to specific courses
* Retrieve all students in a given course
* Find all courses an instructor teaches
* Track grades and generate student reports
* Calculate average GPA per course

**MySql is used: Version 9.2.0**