Introduction to Databases
2025-2026
Project: Erasmus Curriculum Database Integration
(Do the project with your 2-to-4-members team. Due date is 22 December 2025)

MAIN SCENARIO

In this project, you will design a relational database system for the Erasmus student exchange program, focusing on how different university curriculums can be compared, matched, and integrated. The goal is to understand how data modeling can make the Erasmus process—especially course equivalency between departments—more transparent and efficient.

You will start by choosing three different Computer or Informatics-related departments from universities in Türkiye. These could be, for example, Computer Engineering, Software Engineering, or Information Systems Engineering programs. You will collect their curriculum data, including course names, codes, ECTS credits, semester plans, prerequisites, and short course descriptions.

First, you will analyze and design an EER (Enhanced Entity-Relationship) diagram for each department separately. Each EER diagram should clearly show the structure and relationships between courses, semesters, and other academic elements in that department.

Next, you will create an integrated EER model that combines the three curriculums. This model should allow users to see how courses from different departments are related or equivalent to each other, how ECTS credits align, and how the programs overlap or differ. Think of this as building a "bridge" between universities so that Erasmus students can easily find which courses match the ones they want to take abroad.

The focus of this project is database analysis and design, not coding or implementation. Your creativity and reasoning about how to combine different structures into one meaningful and consistent database are what matter most.

By completing this project, you will learn how to handle real-world data integration problems, gain practical experience in conceptual and logical database design, and see how databases play a big role in academic data management and student mobility systems.

ANALYSIS

In this step, you will focus on understanding and analyzing the curriculums of the departments you selected. Each student team should choose three different Computer or Informatics-related departments from universities in Türkiye.

For each department, collect detailed curriculum data such as:

Course names and codes

ECTS credits

Semester or year in which the course is offered

Prerequisites (if any)

Short course descriptions or learning outcomes

After collecting this information, carefully analyze the structure of each curriculum. Think about questions such as:

How is the program organized (by semester or by level)?

How do prerequisite rules affect course sequencing?

How might these courses match or overlap with those in other departments?

Your goal is to identify the key data elements that need to be represented in your database. In other words, define what kind of data is necessary to show how curriculums can be compared or aligned within the Erasmus exchange context.

Each curriculum analysis will be evaluated separately (4 points each), so make sure your documentation is clear, well-organized, and supported by your understanding of the Erasmus program's data needs.

DESIGN - CONCEPTUAL MODEL

In this part, you will move from analysis to conceptual design, where you transform your findings into clear EER diagrams.

Start by creating separate EER diagrams for each of the three departments you analyzed. Each diagram should accurately represent the data requirements and structure of that department's curriculum — including courses, semesters, prerequisites, and relationships between them. Each EER diagram will be evaluated separately (5 points each).

After completing the three individual EER diagrams, your next task is to combine them into a single integrated EER model (worth 23 points). This model should bring together all three curriculums into one unified design that allows comparisons and relationships to be clearly represented.

Before you start merging, explain your integration approach — for example, how you identify common entities (like "Course" or "ECTS Credit"), handle naming differences, or resolve overlaps and conflicts among the three curriculums.

Your final integrated EER model should show how different departments' courses can be mapped or matched under the Erasmus framework, making it possible to see equivalencies and relationships between programs. This step will help you understand how data modeling supports interoperability and academic collaboration between universities.

DESIGN - LOGICAL MODEL

(18 pts) In this step, you will convert your integrated EER diagram into a relational model by applying the methodology and normalization rules you learned in class.

Your goal is to clearly define tables, attributes, primary keys, and foreign keys that accurately represent the relationships in your integrated EER model. Make sure your design avoids redundancy and maintains data consistency.

By the end of this step, you should have a complete relational schema that could be directly implemented in a database system to manage and compare Erasmus curriculum data across the selected departments.

IMPLEMENTATION - PHYSICAL MODEL

1. (4 pts) Write SQL DDL scripts to create the database and relational model. You can select any DBMS you wish.

2. (4 pts) Populate your database with sample data (using SQL scripts). Include at least sample curriculum data from the three departments you analyzed. The tables should contain enough tuples to test SELECT statements properly.

3. (3 pts) Write 3 meaningful triggers for 3 different tables.

4. (3 pts) Define 3 meaningful check constraints related to curriculum or course equivalency rules.

5. Write the following SQL statements:

    a. (3 pts) Write sample INSERT, DELETE, and UPDATE statements for 3 of your tables.

    b. Write 5 SELECT statements for the database:

        i. (2 pts) 2 of them should use a minimum of 2 tables.

        ii. (3 pts) 3 of them should use a minimum of 3 tables.

    c. (2 pts each) Write 5 original SELECT statements that provide meaningful academic insights.

GRADING

ANALYSIS – 12 points DESIGN – 56 points IMPLEMENTATION – 32 points

If you have any questions, please contact cem.alici@ege.edu.tr with Subject “#IDB-Project” tag.