In this project, you will design a database model for the extended version of the database design given below:
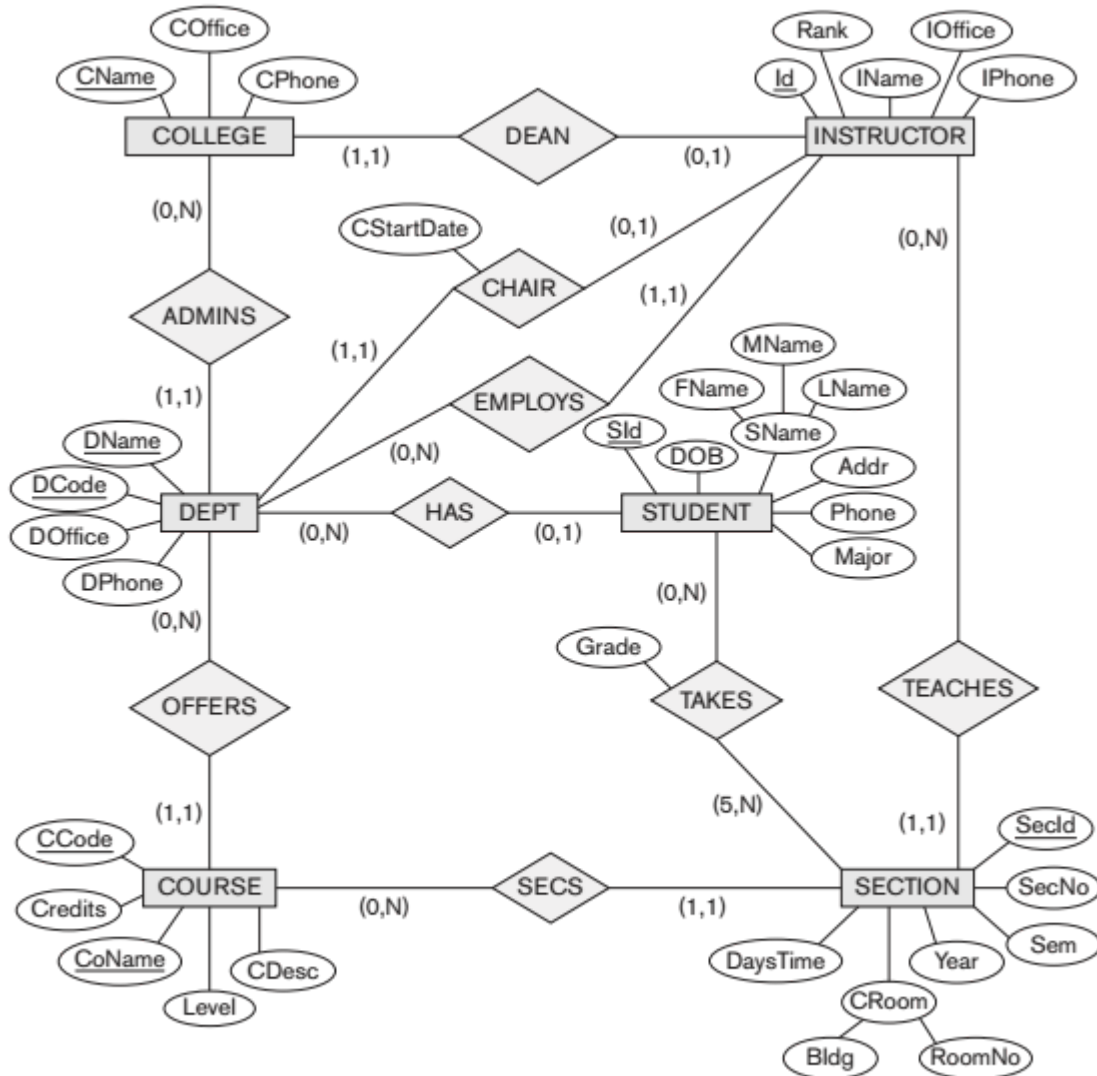

Figure 3.20
An ER diagram for a UNIVERSITY database schema.

The project is more than a technical implementation project, which means it should be much more concentrated on the design of the database. How you extend is critical for the evaluation and the originality of your design is crucial. Here are the newly added requirements (not data requirements) in general.

- Your database should keep track of the curriculums of each of the following departments in Turkey, respectively, Computer Engineering, Software Engineering, Artificial Intelligence Engineering.

- Each curriculum is composed of its own courses of type mandatory, optional (technical or non-technical). (You can examine the web pages https://ebp.ege.edu.tr/DereceProgramlari/Detay/1/31/2626/932001, https://ebp.ege.edu.tr/DereceProgramlari/Ders/1/2626/122067/634383/1)
- Your design should have entities like CHAIR, FACULTY MEMBER (PROFESSOR, ASSOCIATE PROFESSOR, ASSISTANT PROFESSOR, INSTRUCTOR, RESEARCH ASSISTANT)
- Your design should be able to store the instructors of the courses with their SECTION information.
- You should store information about the research areas of the FACULTY MEMBERs, their M.Sc. and Ph.D. theses.
- You should also store the keywords associated with each course and these keywords should be related to the research areas of the FACULTY MEMBERs to find whether a given COURSE is instructed by the most matched FACULTY MEMBER.
- For each of the course and curriculum, you should store a computed value of this matching criteria.

After analyzing the given design, you are expected to:

ANALYSIS

1. Write a brief explanation using your own words (in English) about the given design.

2. Write an analysis report:
   a. What is the aim of your design?
   b. What are the main entities?
   c. What are the characteristics of each entity?
   d. What relationships exist among the entities?
   e. What are the constraints related to entities, their characteristics and the relationships among them?

DESIGN-CONCEPTUAL DESIGN

3. Create an EER diagram. Try to use enhanced/extended features of ER modeling. Do not use any tool. You can use any drawing application with the right legend for ER modeling. The output of this step is just an EER diagram.
4. The most important point of your design is how to extend the original design and generate added value. Therefore, you should accurately examine the extensions to the original design. You should determine the interaction points of the newly added requirements. You can define new entities where interaction and integration are required. At this point your creativity has an artistic significance.

5. Write down the data requirements for the EER diagram.

DESIGN-LOGICAL MODEL

6. Convert EER diagram into relational model using the methodology that will be introduced in your course.

IMPLEMENTATION-PHYSICAL MODEL

7. Write down the appropriate SQL scripts (DDL statements) for creating the database and its relational model. You can select any of the DBMS you wish.

8. Populate the database you just created again using SQL script file loaded with sample tuples. The initial database should have the tuples of our department. (The tables should have enough tuples for the SELECT statements to be run accordingly.)

9. Write down 3 triggers for 3 different tables. Triggers should be meaningful.

10. Write down 3 check constraints and 3 assertions. Check constraints and assertions should be meaningful.

11. Write down the following SQL statements:
    a. Write sample INSERT, DELETE and UPDATE statements for 3 of the tables you have chosen.
    b. Write 10 SELECT statements for the database you have implemented.
        i. 3 of them should use just one table.
        ii. 4 of them should use a minimum of 2 tables.
        iii. 3 of them should use a minimum of 3 tables.
    c. Write 5 original SELECT statements that you think critical to interaction and integration points for the database.

GRADING:

ANALYSIS   40 points.

DESIGN   30 points.

IMPLEMENTATION   30 points.