# CS 575 – Topics in Database Systems, Homework 2

This is an individual assignment.

Consider the following requirement analysis description and the relevant ER diagram design.

- The university is organized into colleges (COLLEGE), and each college has a unique name (CName), a main office (COffice) and phone (CPhone), and a particular faculty member who is dean of the college. Each college administers a number of academic departments (DEPT). Each department has a unique name (DName), a unique code number (DCode), a main office (DOffice) and phone (DPhone), and a particular faculty member who chairs the department. We keep track of the start date (CStartDate) when that faculty member began chairing the department.

- A department offers a number of courses (COURSE), each of which has a unique course name (CoName), a unique code number (CCode), a course level (Level: this can be coded as 1 for freshman level, 2 for sophomore, 3 for junior, 4 for senior, 5 for MS level, and 6 for PhD level), a course credit hours (Credits), and a course description (CDesc). The database also keeps track of instructors (INSTRUCTOR); and each instructor has a unique identifier (Id), name (IName), office (IOffice), phone (IPhone), and rank (Rank); in addition, each instructor works for one primary academic department.

- The database will keep student data (STUDENT) and stores each student's name (SName, composed of first name (FName), middle name (MName), last name (LName)), student id (Sid, unique for every student), address (Addr), phone (Phone), major code (Major), and date of birth (DoB). A student is assigned to one primary academic department. It is required to keep track of the student's grades in each section the student has completed.

- Courses are offered as sections (SECTION). Each section is related to a single course and a single instructor and has a unique section identifier (SecId). A section also has a section number (SecNo: this is coded as 1, 2, 3, . . . for multiple sections offered during the same semester/year), semester (Sem), year (Year), classroom (CRoom: this is coded as a combination of building code (Bldg) and room number (RoomNo) within the building), and days/times (DaysTime: for example, 'MWF 9am-9.50am' or 'TR 3.30pm-5.20pm'— restricted to only allowed days/time values). (*Note*: The database will keep track of all the sections offered for the past several years, in addition to the current offerings. The SecId is unique for all sections, not just the sections for a particular semester.) The database keeps track of the students in each section, and the grade is recorded when available (this is a many-to-many relationship between students and sections). A section must have at least five students.
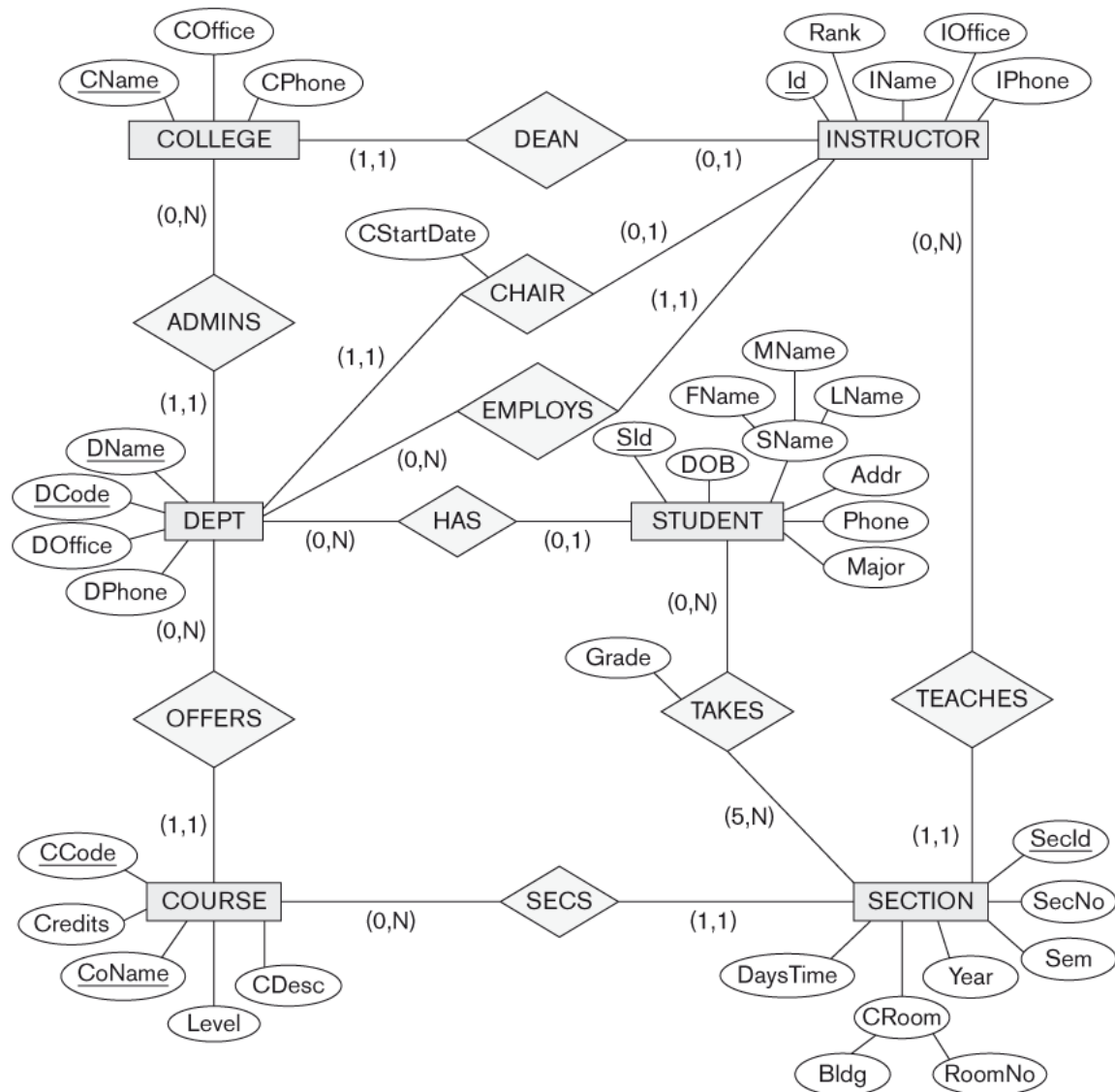
1. How can you enhance the given ER diagram by introducing a superclass/subclass relationship for following entities? Draw a modified EER diagram to reflect the necessary changes to the above ER diagram. Clearly define your assumptions (such as Faculty/Grad_student relationship via ADVISER, COMMITTEE etc.)
   - PERSON, FACULTY, GRAD_STUDENT, INSTRUCTOR_RESEARCHER, CURRENT_SECTION

2. Convert your modified EER diagram into a Relational Database Schema reflecting the referential integrity constrains in the relational schema design (arcs to display foreign key relationships).