**UNIVERSITY DATABASE**

**1 ER-Diagram**

A university wants to design a database with the following entities:

1. • Student with matriculation number, name, address and semester
2. • Subject**1** (Computer Science, Electrical Engineering..) with subject number, name and degree (Diploma, Master..)
3. • Chair (“Lehrstuhl”) with chair number, name, and address
4. • Employee with name and social security number(ssn), address and degree
5. • Courses with course number, name, place, kind and dates

Furthermore, there are the following relationships:

Students are enrolled in subjects, students visit courses. Chairs provide courses, employees are on the head of a chair (for Professors). Employees work at chairs. Employees support courses. Chairs belong to subjects. Employees are supervised by other employees.

Design the ER model for this company (without cardinality restrictions)!

**2 Cardinality constraints I** Cardinality constraints are important for relationships in ER models. There are two possibilities to define cardinality restrictions in ER diagrams:

1. a) 1:1, 1:m or m:n notation
2. b) (min, max) notation

Extend the ER model of exercise 1 by defining the cardinality restrictions using both possibilities (a+b) taking into account the following constraints:

Students are registered on at least one subject. On each subject at least 50 students are subscribed. Students can visit any number of courses. A course is visited by at least 10 students. A chair can provide any number of courses, a course belongs to exactly one chair. An employee supports at most two courses. A course is supported by at least one employee. An employee works on exactly one chair. On each chair work at least two employees. Every chair is headed by only one employee. An employee can be the head of only one chair. A chair belongs to exactly one subject. A subject has at least three chairs. An employee is supervised by at most one employee. An employee can supervise any number of employees.

Note: You will not be able to formalize all restrictions using notation a).