

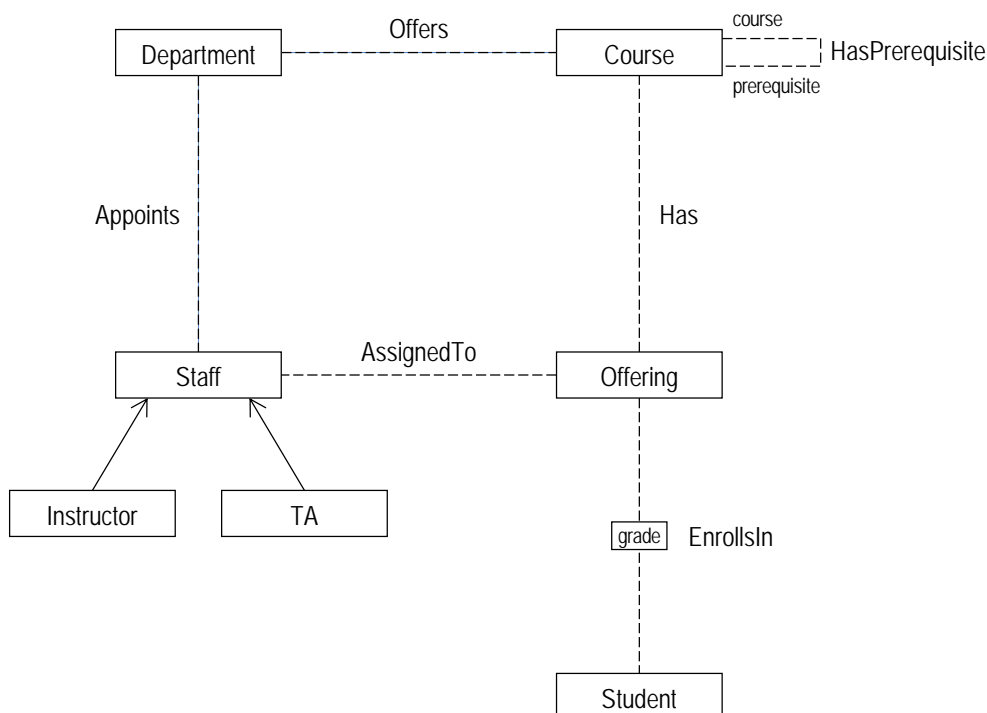
# COMP 3311: Database Management Systems

## Lecture 3 Exercises Entity-Relationship (E-R) Model and Database Design

**Exercise 1:** We want to record information about students, departments, courses and course teaching teams.

- For each student we store the student id, name and majors.
- For each department we store a unique code and name.
- For each course we store a unique course id, name, department and prerequisites.
- For each offering of a course we store the section, semester and year.
- Each student must enroll in one to five course offerings.
- Each course offering can enroll zero to sixty students.
- For each course offering that a student takes we store the grade.
- Each course offering's teaching team has one or more staff, who is either an instructor or a TA.
- For each staff assigned to a course offering's teaching team we store the hkid, name, department and office number.
- For each instructor we store their academic title (i.e., professor, lecturer, etc.).

**For the university application E-R diagram shown below, identify keys and discriminators of entities, weak entities and their identifying relationship(s) and show relationship cardinality and participation constraints.**



Student
studentId
name
{major}

Department
code
name

Course
courseId
name

Offering
section
semester
year

Staff
hkid
name
officeNumber

Instructor
title

TA
----

Name: (1) \_\_\_\_\_ / \_\_\_\_\_ Student#: (1) \_\_\_\_\_ Date: \_\_\_\_\_  
Family/Given (PRINT) Given/First (PRINT)

Name: (2) \_\_\_\_\_ / \_\_\_\_\_ Student#: (2) \_\_\_\_\_  
Family/Given (PRINT) Given/First (PRINT)

**NOTE:** You are highly encouraged to do this exercise with a partner.

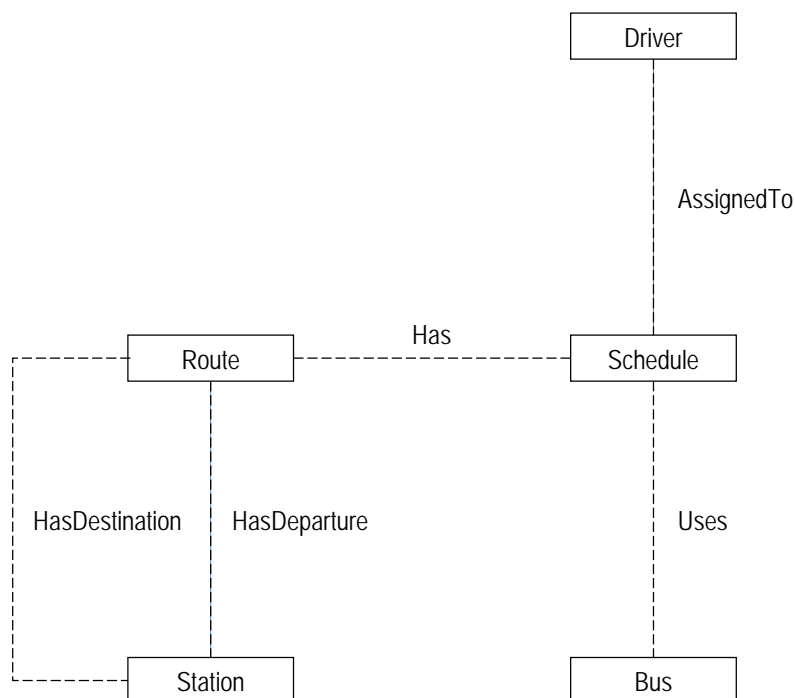
## COMP 3311: Database Management Systems

### Lecture 3 Exercises Entity-Relationship (E-R) Model and Database Design

**Exercise 2:** We want to keep track of bus routes and schedules for a bus company.

- Each bus route has a unique route number, a departure station and a destination station.
- For each bus route, there is a schedule, which records the departure times of buses.
- For each departure time of each route, a driver and a bus can be assigned. However, information about the driver or the bus may sometimes be missing.
- A driver has a unique employee id, a name and a phone number.
- A bus is identified by its license number and has a maximum seating capacity.

**For the bus company application E-R diagram shown below, identify keys and discriminators of entities, weak entities and their identifying relationship(s) and show relationship cardinality and participation constraint.**



Route
routeNo

Schedule
departureTime

Driver
empld name phoneNo

Bus
licenseNo maxSeating

Station
name

You must upload this completed exercise sheet to Canvas by **11 p.m. today.**