1. **Draw the E‑R diagram for HEG.**
2. **Describe the relationship between instructor and course in terms of connectivity, cardinality, and existence dependence.**

Both questions, a and b, have been addressed in the following E‑R diagram. Basically, three sets of relationships exist: A COURSE may generate one or more CLASSes, an INSTRUCTOR teaches up to two CLASSes, and a TRAINEE may enroll in up to two CLASSes. A trainee can take more than one class, and each class contains many (10 or more) trainees, so there is a M:N relationship between TRAINEE and CLASS. (We must, therefore, create a composite entity to serve as the bridge between TRAINEE and CLASS.) A class is taught by only one instructor, but an instructor can teach up to two classes. Therefore, there is a 1:M relationship between INSTRUCTOR and CLASS. Finally, a COURSE may generate more than one CLASS, while each CLASS is based on one COURSE, so there is a 1:M relationship between COURSE and CLASS. These relationships are all reflected in the following E-R diagram. Note the optional and mandatory relationships: to exist, a CLASS must have TRAINEEs enrolled in it, but TRAINEEs do not necessarily take CLASSes. (Some may take "on the job training.") An INSTRUCTOR may not be teaching any CLASSes, doing research instead, but each CLASS must have an INSTRUCTOR. If not enough people sign up for a CLASS, a COURSE may not generate any CLASSes, but each CLASS must represent a COURSE.

**Figure Q3.8 The E-R Diagram for HEG**