

## **Practice questions for Session 3-5 on** **ERD**

Draw an E-R Diagram for each of the following. Clearly state any additional assumptions if necessary.

1. A company has a number of employees. The attributes of EMPLOYEE include EMPLOYEE\_ID (identifier), Name, Address and Birthdate. The company also has several projects. Attributes of PROJECT include PROJECT\_ID (identifier), Project\_Name, Start\_Date. Each employee may be assigned to one or more projects, or may not be assigned to any project. A project must have at least one employee assigned, and may have any number of employees assigned. An employee's billing rate may vary by project, and the company wishes to record the applicable billing rate (Billing\_Rate) for each employee when assigned to a particular project.
2. A university has a large number of courses in its catalog. Attributes of course include Course\_Number (identifier), Course\_Name and Units. Each course may have one or more different courses as prerequisites, or may have no prerequisites. Similarly, a particular course may be a prerequisite for any number of courses, or may not be prerequisite for any other courses.
3. A college course may have one or more scheduled sections, or may not have a scheduled section. Attributes of COURSE include Course\_Id, Course\_Name and Units. Attributes of SECTION include Section\_Number and Semester\_ID. Semester\_ID is composed of two parts: Semester and Year. Section\_Number is an integer (such as '1' and '2') that distinguishes one section from another for the same course but does not uniquely identify a section.
4. A hospital has a large number of registered physicians. Attributes of PHYSICIAN include Physician\_ID (the identifier) and Speciality. Patients are admitted to the hospital by physicians. Attributes of PATIENTS include Patient\_ID (the identifier) and Patient\_Name. Any patient who is admitted must have exactly one admitting physician. A physician may optionally admit any number of patients. Once admitted, a given patient must be treated by at least one physician. A particular physician may treat any number of patients, or may not treat any patients. Whenever a patient is treated by a physician, the hospital wishes to record the details of the treatment (Treatment\_Detail). Components of Treatment\_Details include Date, Time and Results.
5. A laboratory has several chemists who work on one or more projects. Chemists may also use certain kinds of equipment on each project. Attributes of CHEMIST include Employee\_ID (identifier), Name and Phone\_No. Attributes of PROJECT include Project\_ID (identifier), and Start\_Date. Attributes of EQUIPMENT include Serial\_No and Cost. The organization wishes to record Assign\_Date i.e. the date when a given equipment item was assigned to a particular chemist working on a specified project. A chemist must be assigned to at least one project and one equipment item. A given equipment item need not be assigned, and a given project need not be assigned either a chemist or an equipment item.

