شُروع اَللہ کے پاک نام سے جو بڑا مہر بان نہایت رحم والا ہے

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Database Systems

Lecture 14
Entity Relationship Diagram (ERD)

Today's Lecture

- Database Schema Designing
  - Entity Relationship Diagram (ER-D)
  - How to Design an ERD

Recall Lecture 13

- Database Schema Designing
  - Types of Attributes
  - Types of Entities
  - Entities VS Attributes

ERD Notations

Entity   **Attribute**   **Relationship**

Weak Entity   **Multivalued Attribute**   **Weak Relationship**

Example

A university consists of a number of departments. Each department offers several courses. A number of modules make up each course. Students enrol in a particular course and take modules towards the completion of that course. Each module is taught by a lecturer from the appropriate department, and each lecturer tutors a group of students
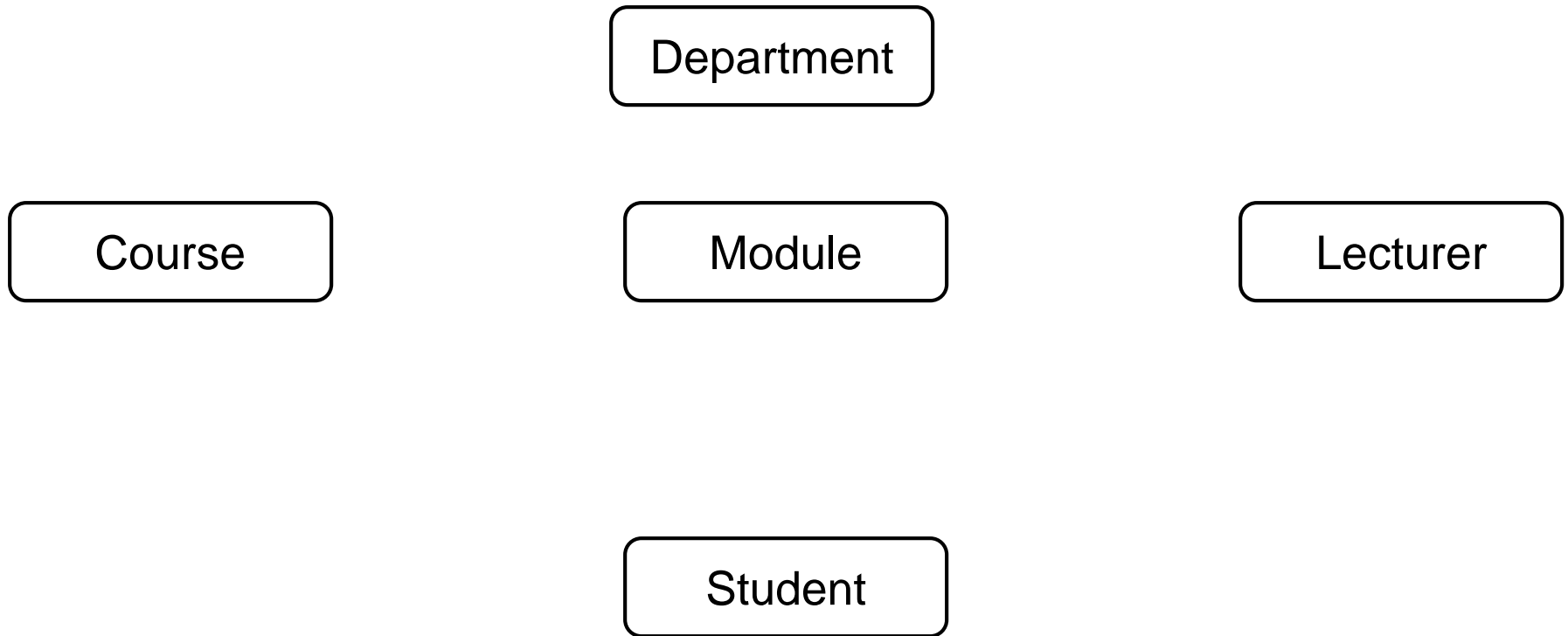
Example - Entities

A university consists of a number of **departments**. Each department offers several **courses**. A number of **modules** make up each course. **Students** enrol in a particular course and take modules towards the completion of that course. Each module is taught by a **lecturer** from the appropriate department, and each lecturer tutors a group of students

Example - Relationships

- A university consists of a number of departments. Each department **offers** several courses. A number of modules **make up** each course. Students **enrol in** a particular course and **take** modules towards the completion of that course. Each module is **taught by** a lecturer **from the** appropriate department, and each lecturer **tutors** a group of students
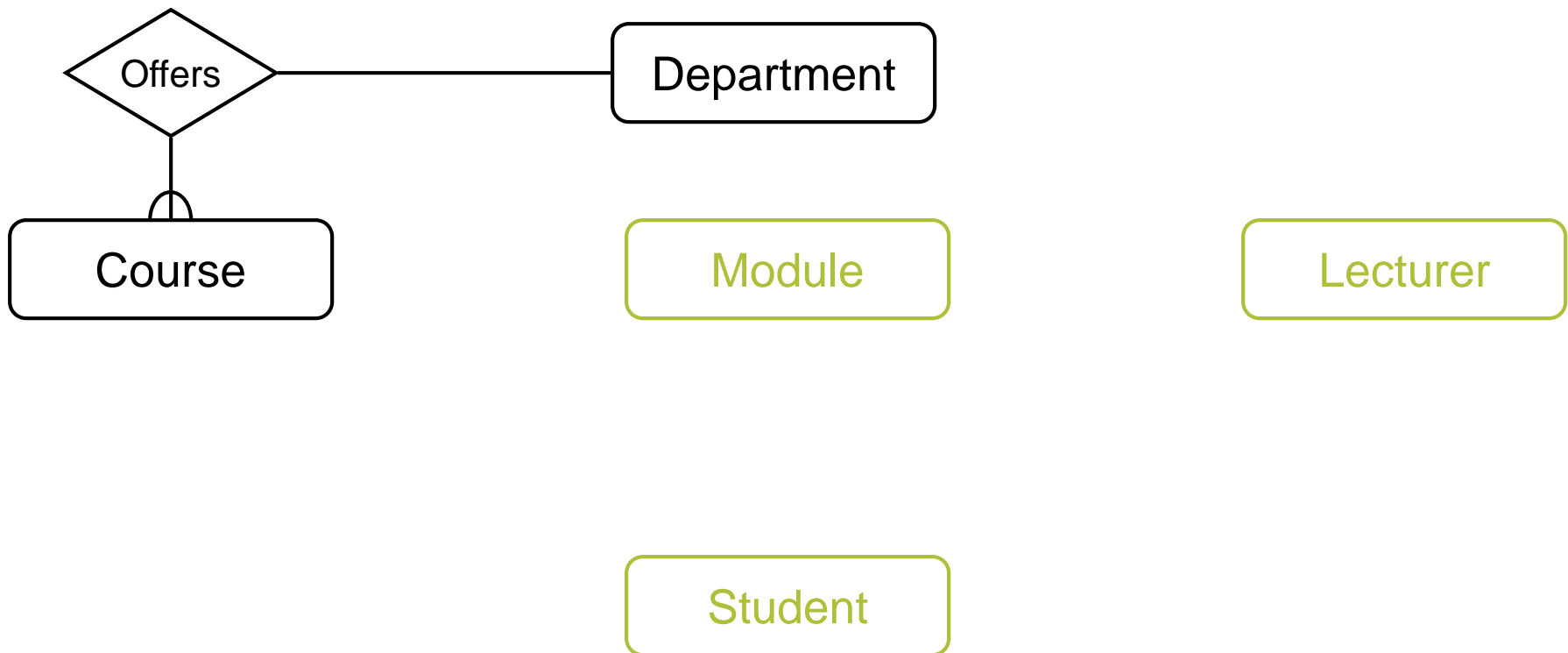
Example - E/R Diagram

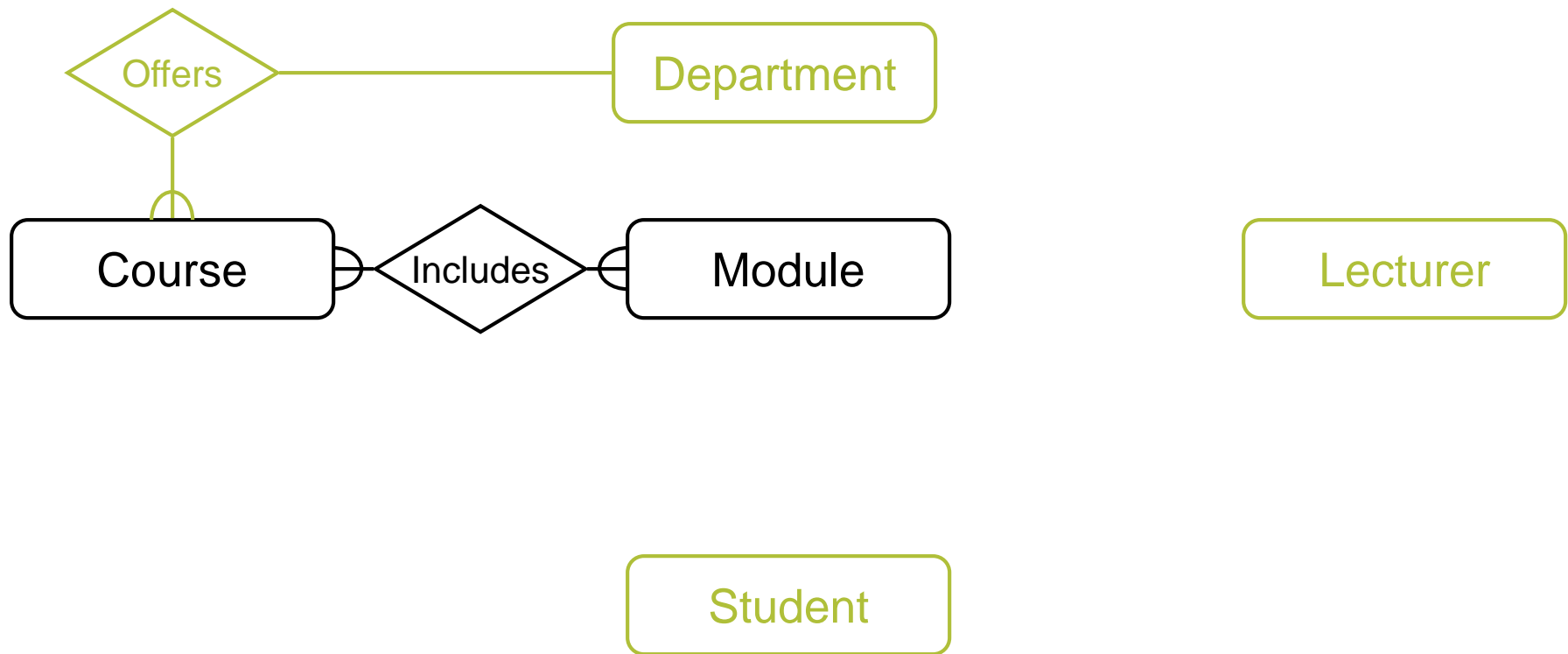Entities: Department, Course, Module, Lecturer, Student

Department

Course

Module

Lecturer

Student

Example - E/R Diagram

Each department offers several courses

Offers

Department

Course

Module

Lecturer

Student

Example - E/R Diagram

A number of modules make up each courses

Offers

Department

Course — Includes — Module

Lecturer

Student

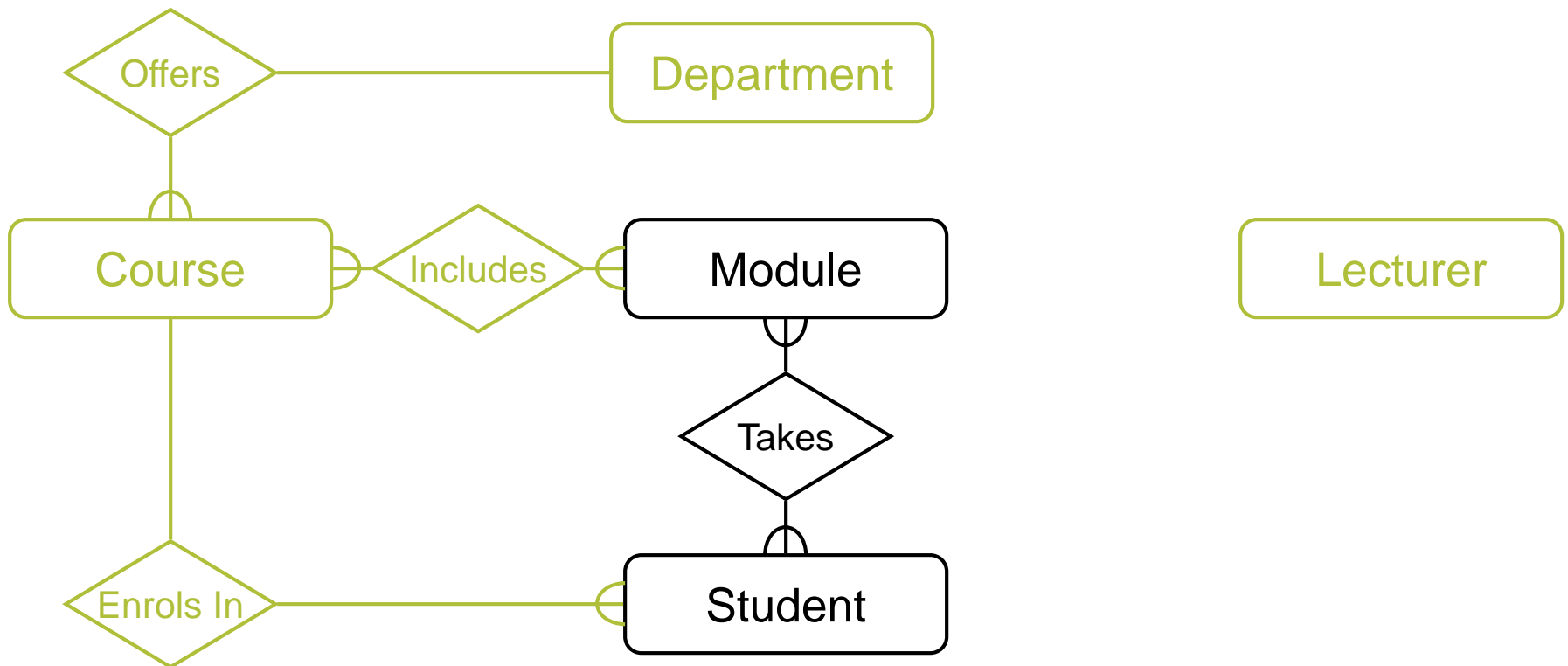# Example - E/R Diagram

Students enrol in a particular course
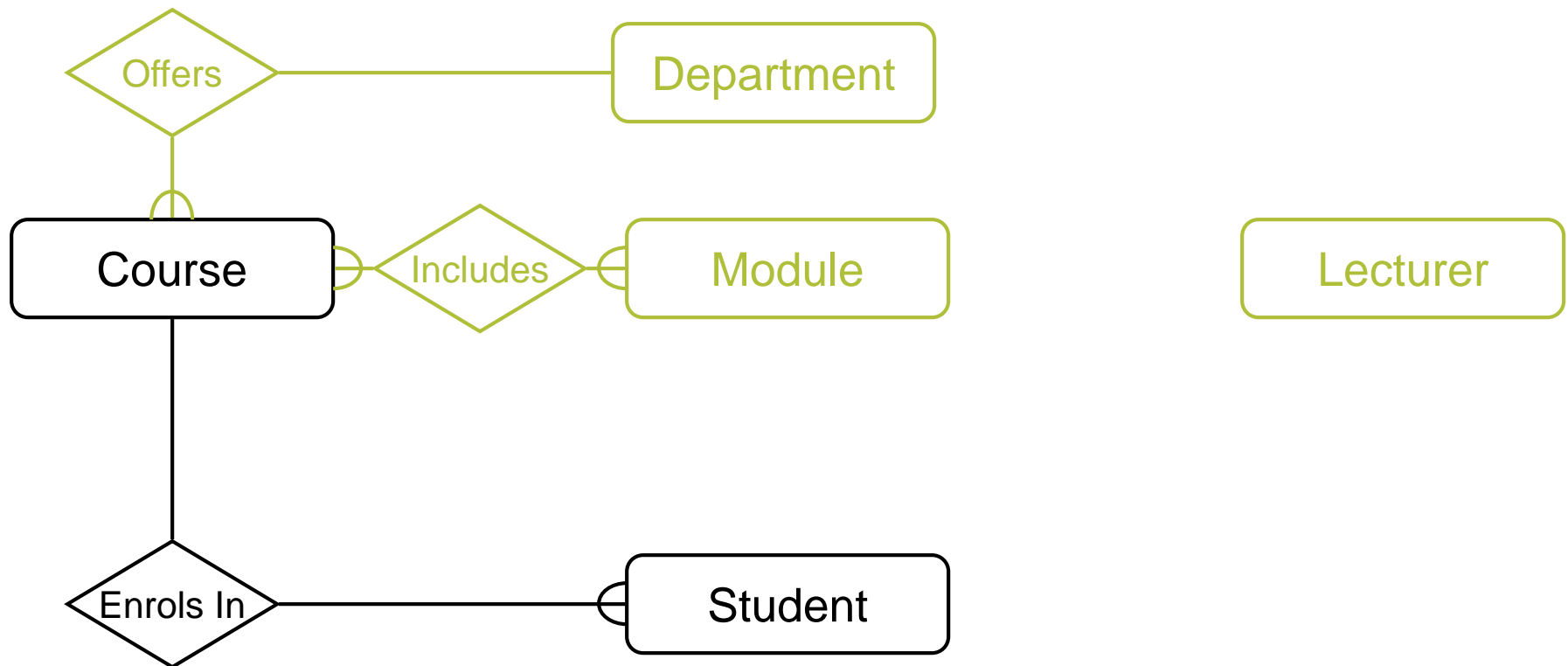
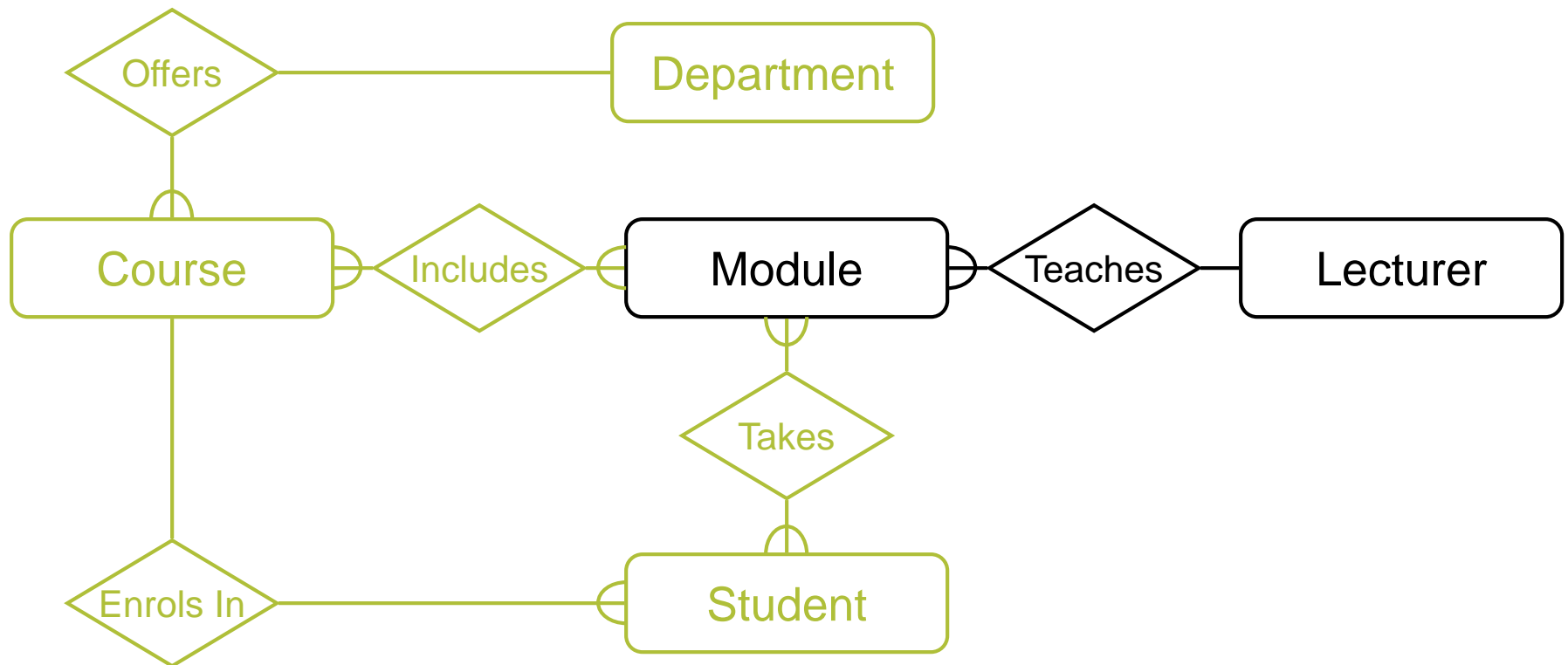# Example - E/R Diagram

Students … take modules

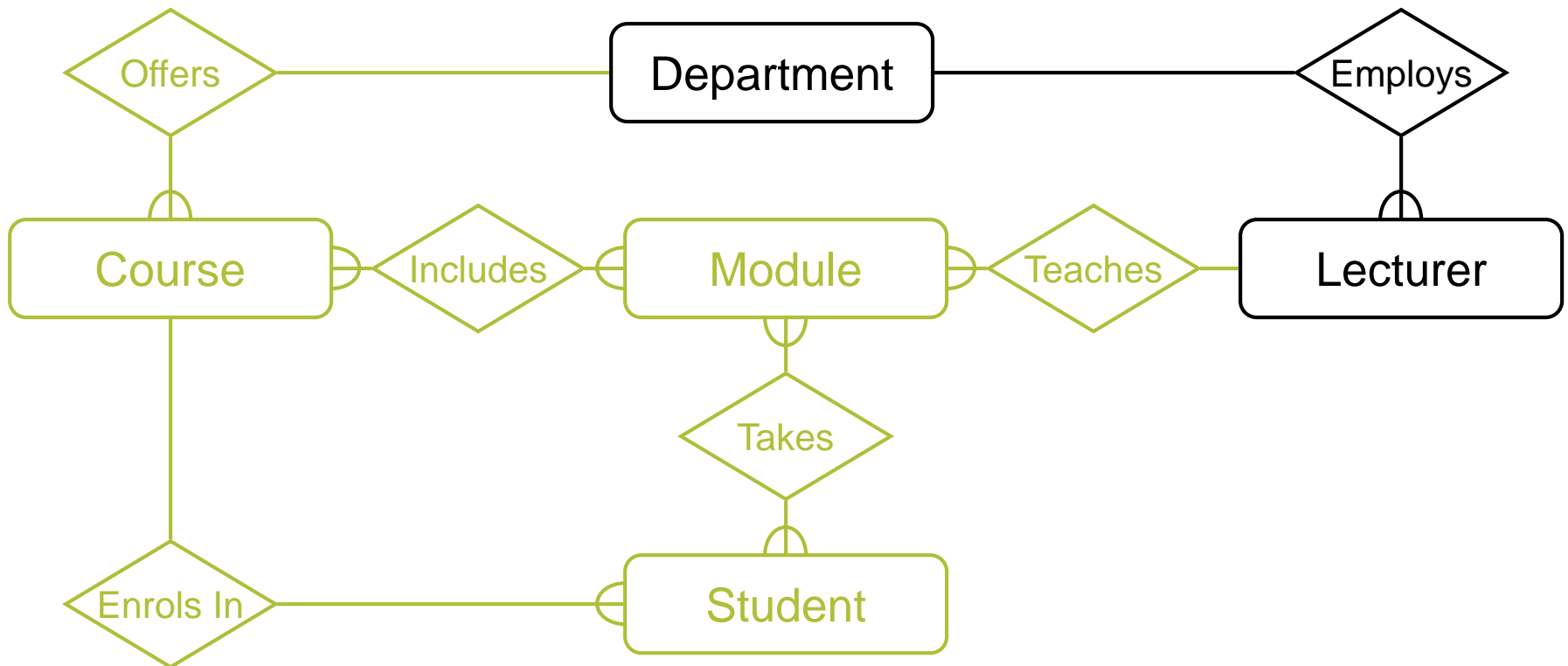# Example - E/R Diagram

Each module is taught by a lecturer

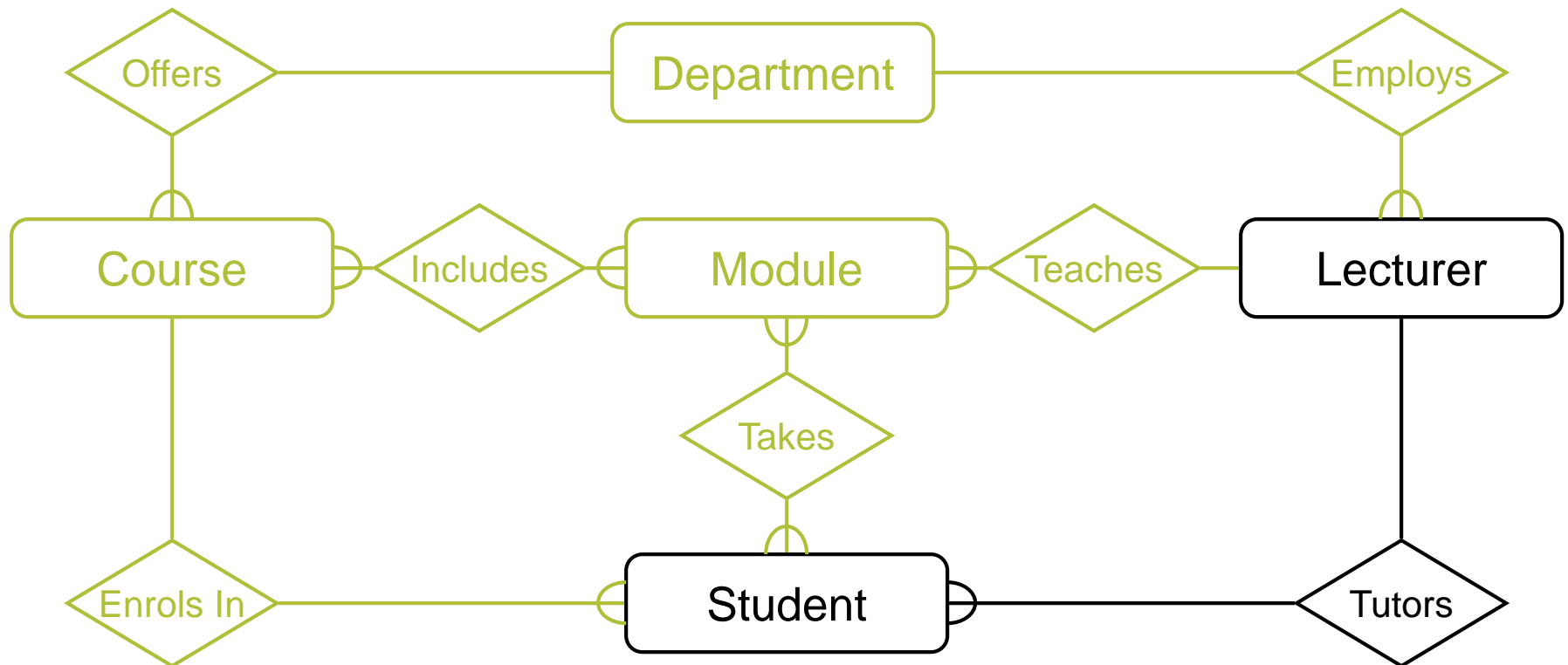# Example - E/R Diagram

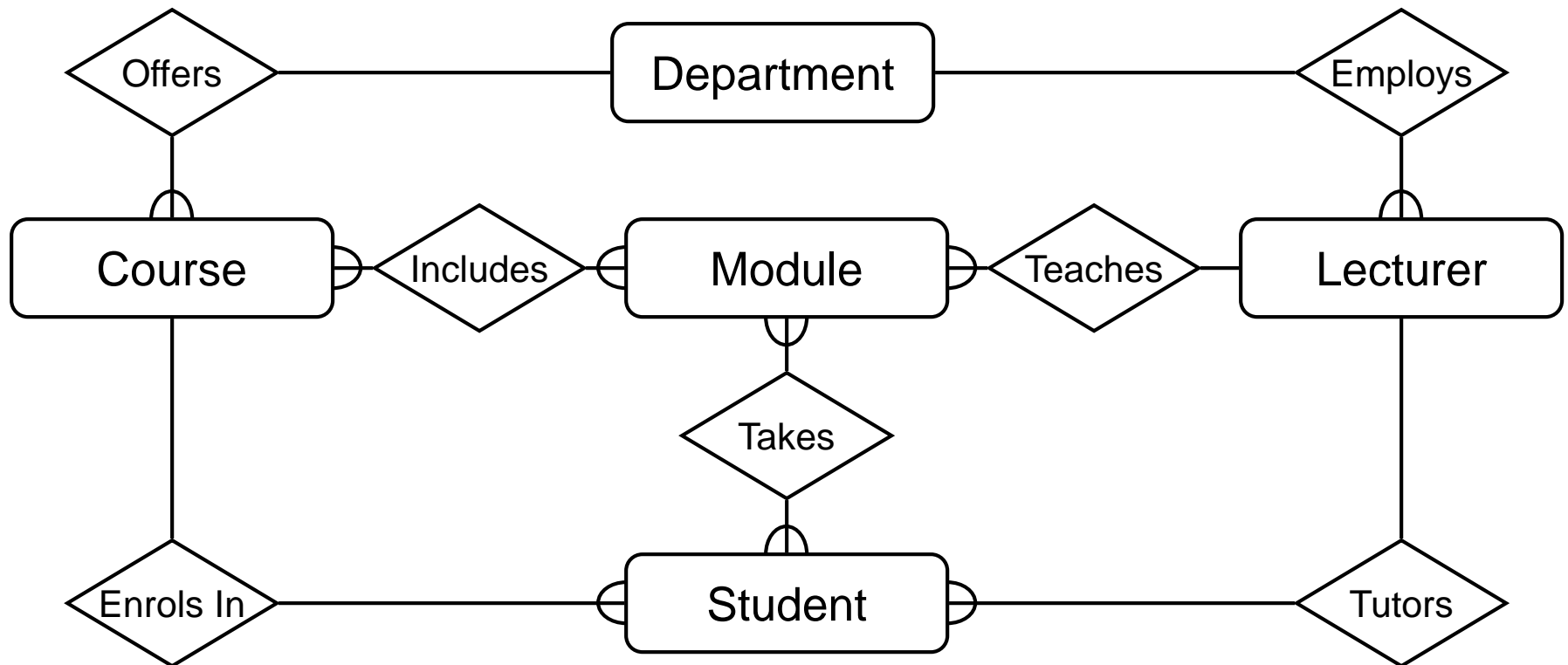a lecturer from the appropriate department

Example - E/R Diagram

each lecturer tutors a group of students

Example - E/R Diagram

Lecture's assignment

- ERD and enterprise hierarchies ?

- How to map enterprise hierarchies in an ERD ?

- What is the major source of information ? and how it can be captured ?

- How many entities and relationships are mandatory for an ERD?

- IS an ERD is formal representation ?

- How to standardized an ERD ?

Assignment : Design an ER Diagram

- Design a database for an on-line reservation system for microscopes in material science lab
- There are two types of users: microscope administrators and microscope end users
- Each microscope is located in a specific lab
- Each request is assigned to an administrator who can authorize or deny the request
- Using of some microscope requires the presence of an administrator
- Time is divided into 1 hour slots. Each reservation can only take one or more time slots

In Next Lecture

- Entity Relationship Diagram (ERD)
  - Types of entities W.R.T to data
  - ER provides basic for Schema refinement
    - Cardinalities based illustrations

Thanks