

Assignment-1

Assignment 1: Analyze a given business scenario and create an ER diagram that includes entities, relationships, attributes, and cardinality. Ensure that the diagram reflects proper normalization up to the third normal form.

BUSINESS SCENARIO: UNIVERSITY MANAGEMENT SYSTEM

Entity: An entity is an object or component of data. An entity is represented as rectangle in an ER diagram.






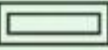
Cardinality: Defines the numerical attributes of the relationship between two entities or entity sets.

Relationship: A relationship is represented by diamond shape in ER diagram, it shows the relationship among entities.

There are four types of cardinal relationships:

1. One to One
2. One to Many
3. Many to One
4. Many to Many

Attribute: An attribute describes the property of an entity. An attribute is represented as Oval in an ER

Symbols	Represents
	Entities in ER Model
	Attributes in ER Model
	Relationships among Entities
	Attributes to Entities and Entity Sets with Other Relationship Types
	Multi-Valued Attributes
	Weak Entity

Entities:

1. Student
2. Course
3. Professor
4. Department
5. Enrollment

Entities with Attributes:

1. Student: Contains information about students enrolled in the university.

- Attributes: Student ID (Primary Key), Name, Email, Phone, Date of Birth, Address.

2.Course: Represents the courses offered by the university.

- Attributes: Course ID (Primary Key), Course Name, Credits, Department.

3.Professor: Contains information about professors teaching at the university.

- Attributes: Professor ID (Primary Key),
- Name,
- Email,
- Phone,
- Department.

4.Department: Represents academic departments within the university.

- Attributes: Department ID (Primary Key),
- Department Name,
- Head of Department.

5.Enrollment: Represents the enrollment of students in courses.

- Attributes: Enrollment ID (Primary Key),
- Student ID (Foreign Key),
- Course ID (Foreign Key),
- Enrollment Date.

Relationships:

Teaches: Relationship between Professor and Course entities. A professor can teach multiple courses, and a course can be taught by only one professor.

Belongs_to: Relationship between Course and Department entities. A course belongs to one department, but a department can offer multiple courses.

Enrolls_in: Relationship between Student and Enrollment entities. A student can be enrolled in multiple courses, and a course can have multiple students enrolled.

Belongs_to: Relationship between Professor and Department entities. A professor belongs to one department, but a department can have multiple professor

Cardinalities:

1.One Professor can teach many Courses (1).

2.One Course belongs to one Department, but a Department can have many Courses (1).

3.One Student can be enrolled in many Courses, and a Course can have many Students enrolled (M).

4.One Professor belongs to one Department, but a Department can have many Professors (1).

Normalize to 3NF

- 1NF: Each table has a primary key and each column contains atomic values.
- 2NF: All non-key attributes are fully dependent on the primary key.
- 3NF: No transitive dependencies; non-key attributes depend only on the primary key

ER Diagram

