Task-1

Entities and attributes :

1. Student
    - Attributes
        - student ID
        - Name
        - Email
        - Phone
        - Department
        - Year
        - Gender

2. Course
    - Attributes
        - Course ID
        - CourseName
        - CreditHours
        - Department

3. Faculty
    - Attributes
        - Faculty ID
        - Name
        - Email
        - Department
        - Designation

4. Attendance
    - Attributes

- Attendance ID
- Student ID
- Course ID
- Attendance Date
- Status

5. Classschedule
   - Attributes
     - ScheduleID
     - CourseID
     - FacultyID
     - Date
     - Timeslot

Relationships and Cardinalities :

1. Student - Attendance :
   - Relationship : A student can have multiple attendance records for different classes.
   - Cardinality : 1 : M (One-to-many).

2. Course - Attendance :
   - Relationship : A course can have multiple attendance records for different students.
   - Cardinality : 1 : M (one-to-many).

3. Faculty - ClassSchedule :
   - Relationship : A faculty member can teach multiple classes
   - Cardinality : 1 : M (one-to-many).

4. Course - Classschedule :

- Relationship : Each scheduled class can have multiple attendance records.
- Cardinality : 1 : M

5. ClassSchedule - Attendance :

- Relationship : Each scheduled class can have multiple attendance records.
- Cardinality : 1 : M

6. Student - Course :

- Relationship : A student can enroll in multiple courses, and each course can have multiple students.
- Cardinality : M : N

In the Attendance Management System ER Diagram, an example of strong entity and weak entity would be :

Strong Entity :

- Student
  - The student entity can exist independently in the database and has a well-defined primary key.

Weak Entity :

- Attendance

- The attendance entity depends on the student and classschedule.
- It doesn't have a unique primary key of its own that can exist independently, but rather replies relies on the foreign key.

Here are examples for key attribute, Composite Attribute, Derived Attribute and multivalued attribute in the context of the attendance Management system ER diagram:

1. Key Attribute :

- Definition : An attribute that uniquely identifies each entity in the set
- Example :
  - In the student entity, student ID is the key attribute as it uniquely identifies each student.

2. Composite Attribute :

- Definition : An attribute composed of multiple other attributes.
- Example :
  - Address in the student entity can be a composite attribute consisting of :
    - Street
    - City
    - State
    - Country

3. Derived Attribute :

- Definition :- An attribute that is calculated or derived from other attributes.
- Example :-
  - In the student entity, age is a derived attribute that can be calculated using :
    - Date of Birth and the current date.

4. Multivalued Attribute :-

- Definition : An attribute that can have multiple values for a single entity instance.
- Example :
  - In the student entity, phone is a multivalued attribute because a student can have multiple phone numbers, such as a personal phone and a parent's phone.

These attributes illustrate the diversity in how information is stored and modeled in an ER diagram.

Here are additional examples of key attribute, composite attribute, derived attribute, and multivalued attribute specific to the Attendance Management System (AMS), excluding the ones mentioned earlier :

1. Key Attribute

- Definition : An attribute that uniquely identifies each entity in the set.
- Example :
  - CourseID in the course entity uniquely identifies each course in the system.

2. Composed Attribute :

- Definition : An attribute composed of multiple sub-attributes.
- Example :
  - In the faculty entity, Name can be a composite attribute consisting of :
    - First Name
    - Middle Name
    - Last Name

3. Derived Attribute :

- Definition : An attribute calculated or derived from other attributes.
- Example :
  - In the class schedule entity, Duration can be a derived attribute calculated as :
    - Endtime - start time

- "Participates in"
- "Associated with"
- "Connected to"
- "Relates to"

Common words | Phrases for relationships:

1. Belongs to | Part of
   - Example:
     - A student belongs to a department
     - A coach is part of a train
2. Has | Owns:
   - Example:
     - A faculty has multiple courses
     - A reservation has a payment.
3. Contains | Includes:
   - Example
     - A classschedule contains multiple Attendance
     - A coach includes multiple seats.
4. Registers | Enrolls:
   - Example:
     - A student enrolls in multiple courses.
     - A passenger registers for reservation

4. Multivalued Attributes :-

- Definition : An attribute that can have multiple values for a single entity instance.

- Example :

- In the faculty entity, specializations can be multivalued attribute as a faculty member might specialize in multiple areas.

Relationship Names ;

1. Student ⟷ Attendance
   - "Marks"
   - "Records"
   - "Maintains"
2. Course ⟷ Attendance
   - "Tracked by"
   - "Mapped to"
   - "Includes"
3. faculty ⟷ classschedule
   - "Conducts"
   - "Assigned to"
   - "Leads"

4. Course ⟷ classschedule

- "scheduled for"
- "Organized as"
- "Part of"

5. classschedule ⟷ Attendance

- "Logs"
- "Linked to"
- "Holds Attendance for"

6. student ⟷ Course

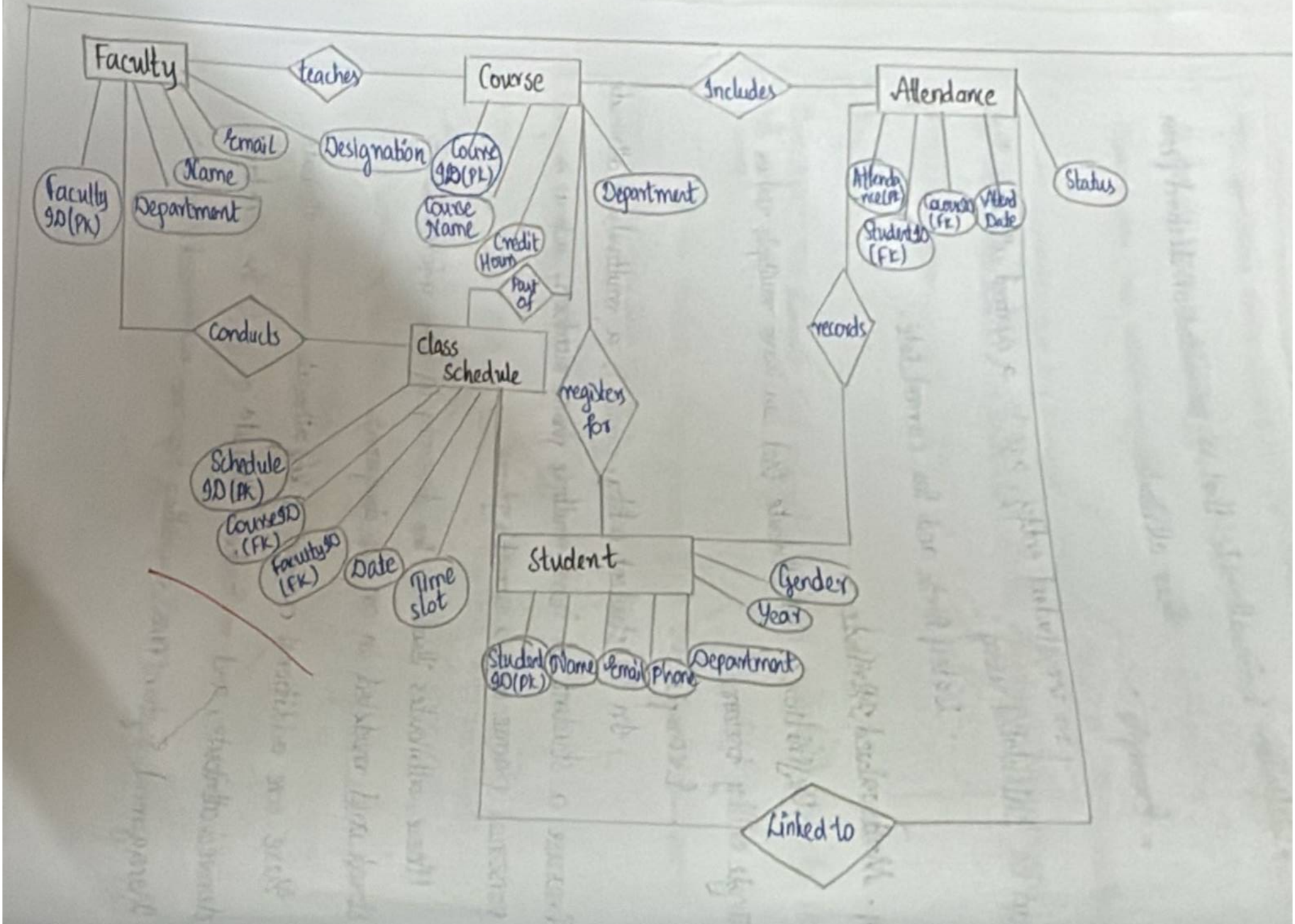
- "Enrolled in"
- "Registers for"
- "Assigned to"

7. Faculty ⟷ Course

- "Teaches"
- "Assigned to"
- "Responsible for"

General Words for Relationships:

- "Manages"
- "Belongs to"
- "Has"


Faculty
teaches
Course
Includes
Attendance
Faculty ID (PK)
Name
Email
Department
Designation
Course ID (PK)
Course Name
Credit Hours
Part of
Department
Attendance ID
Student ID (FK)
Course ID (FK)
Attended Date
Status
Conducts
Class Schedule
records
registers for
Schedule ID (PK)
Course ID (FK)
Faculty ID (FK)
Date
Time slot
Student
Gender
Year
Student ID (PK)
Name
Email
Phone
Department
Linked to

5. Teaches:

- Example:
  - A faculty teaches a course
  - A coach teaches passengers about safety procedures.

6. Assigned to:

- Example:
  - A ticket is assigned to a seat

7. Generates | Issues:

- Example:
  - A system generates a ticket

8. Participates In:

- Example
  - A passenger participates in a journey.

9. Located At:

- Example
  - A station is located at a location

10. Managed by:

- Example
  - A train is managed by a stationMaster.