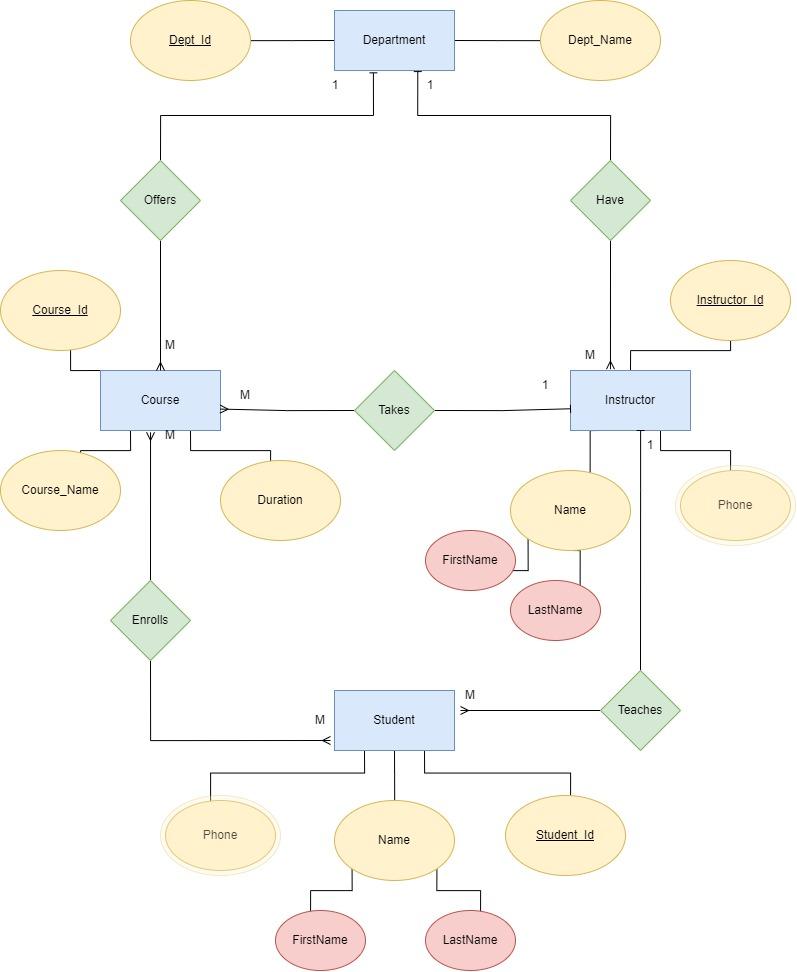
**ER Diagram**

* **What is an ER Diagram ?**

An Entity Relationship (ER) Diagram is a type of flowchart that illustrates how “entities” such as people, objects or concepts relate to each other within a system.

* **ER diagram for college management system :**

1. **Diagram:**

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1. **Insights from the diagram:**
2. One Department can have multiple instructors
3. An instructor can take many courses
4. An instructor can teach many students
5. Students can enroll in any number of courses
6. Department offers many courses

**3) Entities:**

1. Department
2. Courses
3. Instructor
4. Student

**4) Defining Attributes:**

1. **Department:**
2. Department\_Id(Key Attribute)
3. Department\_Name

**b) Instructor:**

1. Instructor\_Id(Key Attribute)
2. Instructor\_Name
3. FirstName
4. LastName
5. Phone

**c) Courses:**

1. Course\_Id(Key Attribute)
2. Course\_Name
3. Duration

**d) Student:**

1. Student\_Id(Key Attribute)
2. FirstName
3. LastName
4. Phone

**5) Minimization of diagram into table:**

1. **A department has many instructor:**

Department(Dept\_name)

Instructor(Instructor\_Id, FirstName, LastName)

Instructor(Instructor\_Id, Phone)

Relation : 1 to M

Has(Instruction\_Id, Dept\_Name, FirstName, LastName, Phone)

1. **A department offers many courses:**

Department(Dept\_name)

Course(Course\_Id, Course\_Name, Duration)

Relation : 1 to M

Offers(Course\_Id, Dept\_Name, Course\_Name, Duration)

1. **A instructor teaches many courses:**

Course(,Course\_Id, Course\_name, Duration)

Instructor(Instructor\_Id, FirstName, LastName)

Instructor(Instructor\_Id, Phone)

Relation : 1 to M

Takes(Course\_Id, Instruction\_Id, Course\_name, Duration)

1. **A instructor teaches many students:**

Student(Student\_Id, FirstName, LastName)

Student(Student\_Id, Phone)

Instructor(Instructor\_Id, FirstName, LastName)

Instructor(Instructor\_Id, Phone)

Relation : 1 to M

Teaches(Student\_Id, Instruction\_Id, FirstName, LastName, Phone)

1. **A student enrolls in many courses:**

Student(Student\_Id, FirstName, LastName)

Student(Student\_Id, Phone)

Course(,Course\_Id, Course\_name, Duration)

Relation : M to M

Enrolls(Student\_Id, Course\_Id)

**Using mysql:**

mysql> create table depart\_offers\_course(course\_id int not null, foreign key(course\_id) references course(course\_id),dept\_id int not null, foreign key(dept\_id) references department(dept\_id), course\_name varchar(255), duration int);

Query OK, 0 rows affected (0.05 sec)

mysql> show tables;

+-------------------------------------+

| Tables\_in\_college\_management\_system |

+-------------------------------------+

| course |

| depart\_offers\_course |

| department |

+-------------------------------------+

3 rows in set (0.01 sec)

mysql> create table instructor\_table\_1(Instructor\_id int not null primary key, firstname varchar(255), lastname varchar(255));

Query OK, 0 rows affected (0.04 sec)

mysql> create table instructor\_table\_2(Instructor\_id int not null, foreign key(instructor\_id) references instructor\_tale\_2(Instructor\_Id), phone int);

ERROR 1824 (HY000): Failed to open the referenced table 'instructor\_tale\_2'

mysql> create table instructor\_table\_2(Instructor\_id int not null, foreign key(instructor\_id) references instructor\_table\_2(Instructor\_Id), phone int);

ERROR 1822 (HY000): Failed to add the foreign key constraint. Missing index for constraint 'instructor\_table\_2\_ibfk\_1' in the referenced table 'instructor\_table\_2'

mysql> create table instructor\_table\_2(Instructor\_id int not null, foreign key(instructor\_id) references instructor\_table\_1(Instructor\_Id), phone int);

Query OK, 0 rows affected (0.05 sec)

mysql> create table dapartment\_has\_instructor(Instructor\_Id int not null, foreign key(Instructor\_Id) references Instructor\_Table\_1(Instructor\_Id), Dept\_Id int not null, foreign key(Dept\_Id) references Department(Dept\_Id), FirstName varchar(255), LastName varchar(255), Phone int, foreign key(Instructor\_Id) references Instructor\_Table\_2(Instructor\_Id));

Query OK, 0 rows affected (0.05 sec)

mysql> create table Instructor\_teaches\_Courses(Course\_id int not null, foreign key(Course\_id) references Courses(Course\_Id), Instructor\_Id int not null, foreign key(Instructor\_Id) references Instructor\_Table\_1(Instructor\_Id), Course\_name varchar(255), Duration int);

ERROR 1824 (HY000): Failed to open the referenced table 'courses'

mysql> create table Instructor\_teaches\_Courses(Course\_id int not null, foreign key(Course\_id) references Course(Course\_Id), Instructor\_Id int not null, foreign key(Instructor\_Id) references Instructor\_Table\_1(Instructor\_Id), Course\_name varchar(255), Duration int);

Query OK, 0 rows affected (0.05 sec)

mysql> create table Student\_Table\_1(Student\_Id int not null Primary Key, FirstName varchar(255), LastName(255));

ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '(255))' at line 1

mysql> create table Student\_Table\_1(Student\_Id int not null Primary Key, FirstName varchar(255), LastName varchar(255));

Query OK, 0 rows affected (0.04 sec)

mysql> create table Student\_Table\_2(Student\_Id int not null Primary Key, Phone int);

Query OK, 0 rows affected (0.04 sec)

mysql> drop Student\_Table\_2;

ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'Student\_Table\_2' at line 1

mysql> drop table Student\_Table\_2;

Query OK, 0 rows affected (0.03 sec)

mysql> create table Student\_Table\_2(Student\_Id int not null, foreign key(Student\_Id) references Student\_Table\_1(Student\_Id), Phone int);

Query OK, 0 rows affected (0.05 sec)

mysql> create table Instructor\_teaches\_Students(Student\_Id int not null, Instructor\_Id int not null, FirstName varchar(255), LastName varchar(255), Phone int, foreign key(Student\_Id) references Student\_Table\_1(Student\_id), foreign key(Student\_Id) references Student\_Table\_2(Student\_id), foreign key(Instructor\_Id) references Instructor\_Table\_1(Instructor\_id), foreign key(Instructor\_Id) references Instructor\_Table\_2(Instructor\_id));

Query OK, 0 rows affected (0.06 sec)

mysql> create table Student\_Enrolls\_Course(Student\_Id int not null, Course\_Id int not null, foreign key(Student\_Id) references Student\_Table\_1(Student\_id), foreign key(Student\_Id) references Student\_Table\_2(Student\_id), foreign key(Course\_Id) references Course(Course\_id));

Query OK, 0 rows affected (0.06 sec)

mysql> show tables;

+-------------------------------------+

| Tables\_in\_college\_management\_system |

+-------------------------------------+

| course |

| dapartment\_has\_instructor |

| depart\_offers\_course |

| department |

| instructor\_table\_1 |

| instructor\_table\_2 |

| instructor\_teaches\_courses |

| instructor\_teaches\_students |

| student\_enrolls\_course |

| student\_table\_1 |

| student\_table\_2 |

+-------------------------------------+

11 rows in set (0.00 sec)

mysql>