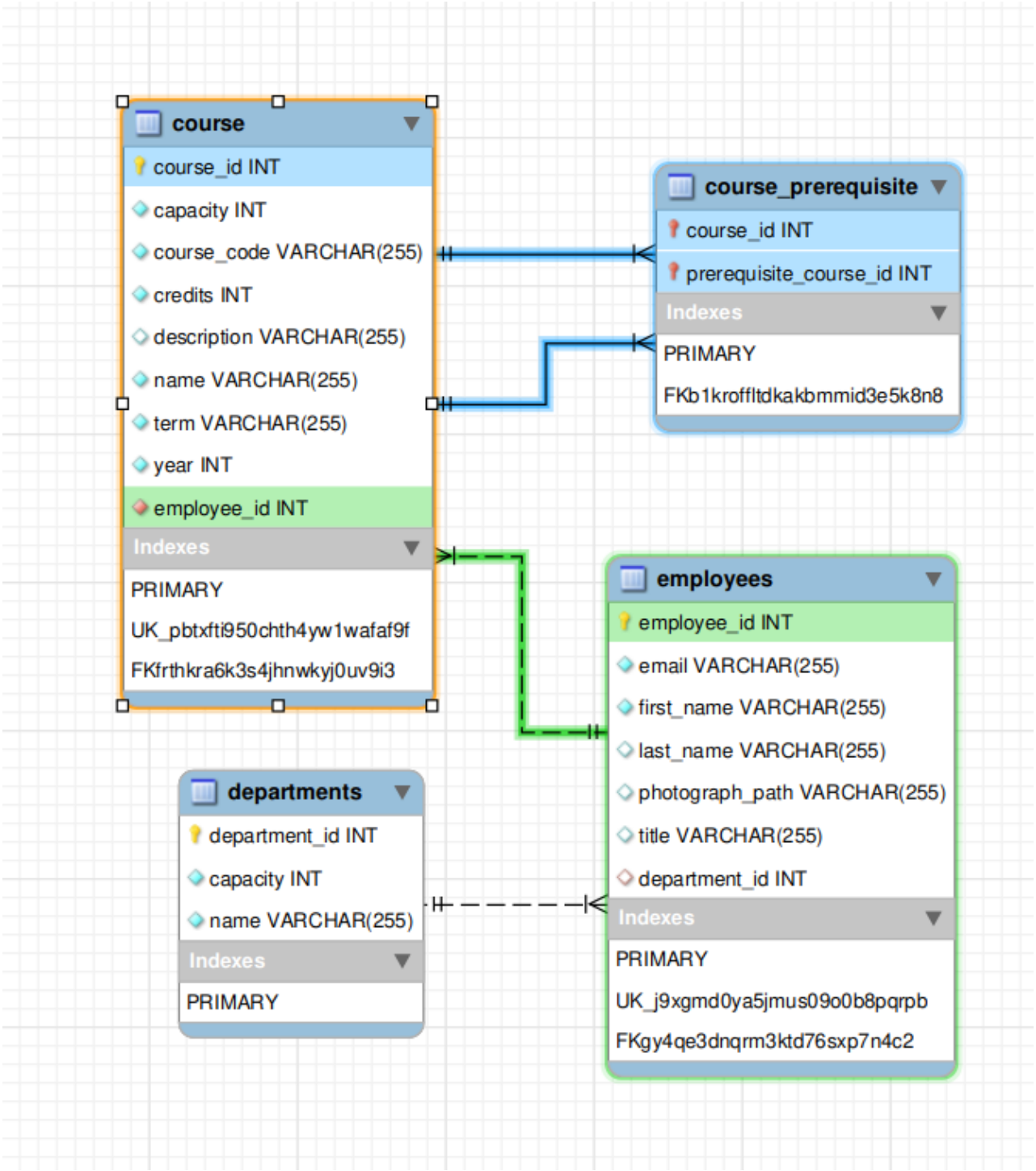
Module 2.3 - Course Update/Delete

Allow the employee of admin department to login. Display the list of courses and allow the user to update/ delete a course. If a pre-requisite course is updated/deleted then the update should cascade throughout

UML Diagram:

Conceptual design using class diagram covering the relevant classes needed



Object–Relational Mapping:

Logical design using OR mapping of the class diagram

Table Name: Course

Name of column	Data type	Constraints (PK, FK, Surrogate, UNIQUE, NOT NULL, etc.)
Course_ID	Number	PK, Surrogate
Capacity	Number	Not Null
Course_Code	String	Unique, Not Null
Credits	Number	Not Null
Description	String	
Name	String	Not Null
Term	String	Not Null
Year	Number	Not Null
Employee_ID	Number	FK References Employees(Employee_ID) Not Null

Table Name: Course_Prerequisite

Name of column	Data type	Constraints (PK, FK, Surrogate, UNIQUE, NOT NULL, etc.)
Course_ID	Number	FK References Course(Course_ID) Not Null On Delete Cascade
Prerequisie_Course_ID	Number	FK References Course(Course_ID) Not Null On Delete Cascade

Table Name: Employees

Name of column	Data type	Constraints (PK, FK, Surrogate, UNIQUE, NOT NULL, etc.)
Employee_ID	Number	PK, Surrogate
Email	String	Unique, Not Null
First_Name	String	Not Null
Last_Name	String	
Photograph_Path	String	
Title	String	
Department_ID	Number	FK References Departments(Department_ID)

Table Name: Departments

Name of column	Data type	Constraints (PK, FK, Surrogate, UNIQUE, NOT NULL, etc.)
Department_ID	Number	PK, Surrogate
Capacity	Number	Not Null
Name	String	Not Null

Implementation design in the form of database script:

The required scripts for database is shown (create_xxx.sql, alter_xxx.sql, insert_xxx.sql)

create_courses.sql

```
DROP DATABASE IF EXISTS coursesdb;
CREATE DATABASE IF NOT EXISTS coursesdb;
USE coursesdb;

DROP TABLE IF EXISTS course, course_prerequisite, employees, departments;

create table course(
        course_id int,
        capacity int,
        course_code varchar(255),
        credits int,
        description varchar(255),
        name varchar(255),
        term varchar(255),
        year int,
        employee_id int,
        constraint course_id PRIMARY KEY (course_id)
);

create table course_prerequisite(
        course_id int,
        prerequisite_course_id int
);

create table employees(
        employee_id int,
        email varchar(255),
        first_name varchar(255),
        last_name varchar(255),
        photograph_path varchar(255),
        title varchar(255),
        department_id int,
        constraint employee_id PRIMARY KEY (employee_id)
);

create table departments(
        department_id int,
        capacity int,
        name varchar(255),
        constraint department_id PRIMARY KEY (department_id)
);
```

alter_courses.sql

```
-- Add foreign key constraint for employee_id in course table
ALTER TABLE course
ADD CONSTRAINT fk_employee_id
FOREIGN KEY (employee_id)
REFERENCES employees(employee_id);

-- Add foreign key constraint for course_id in course_prerequisite table
ALTER TABLE course_prerequisite
ADD CONSTRAINT fk_course_id
FOREIGN KEY (course_id)
REFERENCES course(course_id);

-- Add foreign key constraint for prerequisite_course_id in course_prerequisite table with ON
DELETE CASCADE
ALTER TABLE course_prerequisite
ADD CONSTRAINT fk_prerequisite_course_id
FOREIGN KEY (prerequisite_course_id)
REFERENCES course(course_id)
ON DELETE CASCADE;

-- Add composite foreign key constraint for course_id and prerequisite_course_id in
course_prerequisite table with ON DELETE CASCADE
ALTER TABLE course_prerequisite
ADD CONSTRAINT fk_composite_key
FOREIGN KEY (course_id, prerequisite_course_id)
REFERENCES course(course_id, course_id)
ON DELETE CASCADE;

-- Add foreign key constraint for department_id in employees table
ALTER TABLE employees
ADD CONSTRAINT fk_department_id
FOREIGN KEY (department_id)
REFERENCES departments(department_id);
```

insert_courses.sql

```
INSERT INTO `departments` VALUES (1,100,'CSE');
INSERT INTO `departments` VALUES (2,50,'ECE');
INSERT INTO `departments` VALUES (3,30,'Mathematics');

INSERT INTO `employees` VALUES
(1,'bhumikajindal@gmail.com','Bhumika','Jindal','/path/to/photo','Software Engineer',1);
INSERT INTO `employees` VALUES (2,'asijit@gmail.com','Asijit','Paul','/path/to/photo','Software
Engineer',1);
INSERT INTO `employees` VALUES
(3,'priyanka@iiitb.ac.in','Priyanka','Das','/path/to/photo','Professor',2);
INSERT INTO `employees` VALUES
(4,'sachit.rao@iiitb.ac.in','Sachit','Rao','/path/to/photo','Professor',3);
INSERT INTO `employees` VALUES
(5,'tapan@iiitb.ac.in','Tapan','Saha','/path/to/photo','Professor',3);
INSERT INTO `employees` VALUES (6,'murali@iiitb.ac.in','Muralidhara','V
N','/path/to/photo','Professor',1);
INSERT INTO `employees` VALUES
(7,'moutushi@iiitb.ac.in','Moutushi','Banerjee','/path/to/photo','Professor',1);

INSERT INTO `course` VALUES (8,60,'CS-301',4,'Database Management
Systems','DBMS','Spring',2023,7);
INSERT INTO `course` VALUES (9,100,'CS-511',10,'Data Structures &
Algorithms','Algorithms','Fall',2023,6);
INSERT INTO `course` VALUES (10,200,'CS-501',10,'Coding in C and C+
+','Programming','Spring',2023,2);
INSERT INTO `course` VALUES (11,50,'M-101',5,'Engineering Mathematics','Probability &
Statistics','Summer',2021,3);
INSERT INTO `course` VALUES (12,100,'M-102',4,'Engineering Mathematics','Linear
Algebra','Winter',2022,4);
INSERT INTO `course` VALUES (13,50,'AI-511',6,'Data Science','Machine
Learning','Spring',2023,5);
INSERT INTO `course` VALUES (14,40,'AI-512',10,'Mathematics for ML & AI','Maths for
Machine Learning','Spring',2023,1);
INSERT INTO `course` VALUES (15,100,'AI-611',10,'Natural Langauage
Processing','NLP','Spring',2023,2);
INSERT INTO `course` VALUES (16,100,'AI-612',10,'Few-Shot Learning','FSL','Fall',2023,3);
INSERT INTO `course` VALUES (17,150,'CS-512',8,'Linux and Full-Stack
Development','Software Systems','Fall',2023,5);

INSERT INTO `course_prerequisite` VALUES (9,10);
INSERT INTO `course_prerequisite` VALUES (17,10);
INSERT INTO `course_prerequisite` VALUES (14,11);
INSERT INTO `course_prerequisite` VALUES (9,12);
INSERT INTO `course_prerequisite` VALUES (14,12);
INSERT INTO `course_prerequisite` VALUES (15,13);
INSERT INTO `course_prerequisite` VALUES (16,13);
INSERT INTO `course_prerequisite` VALUES (16,14);
```