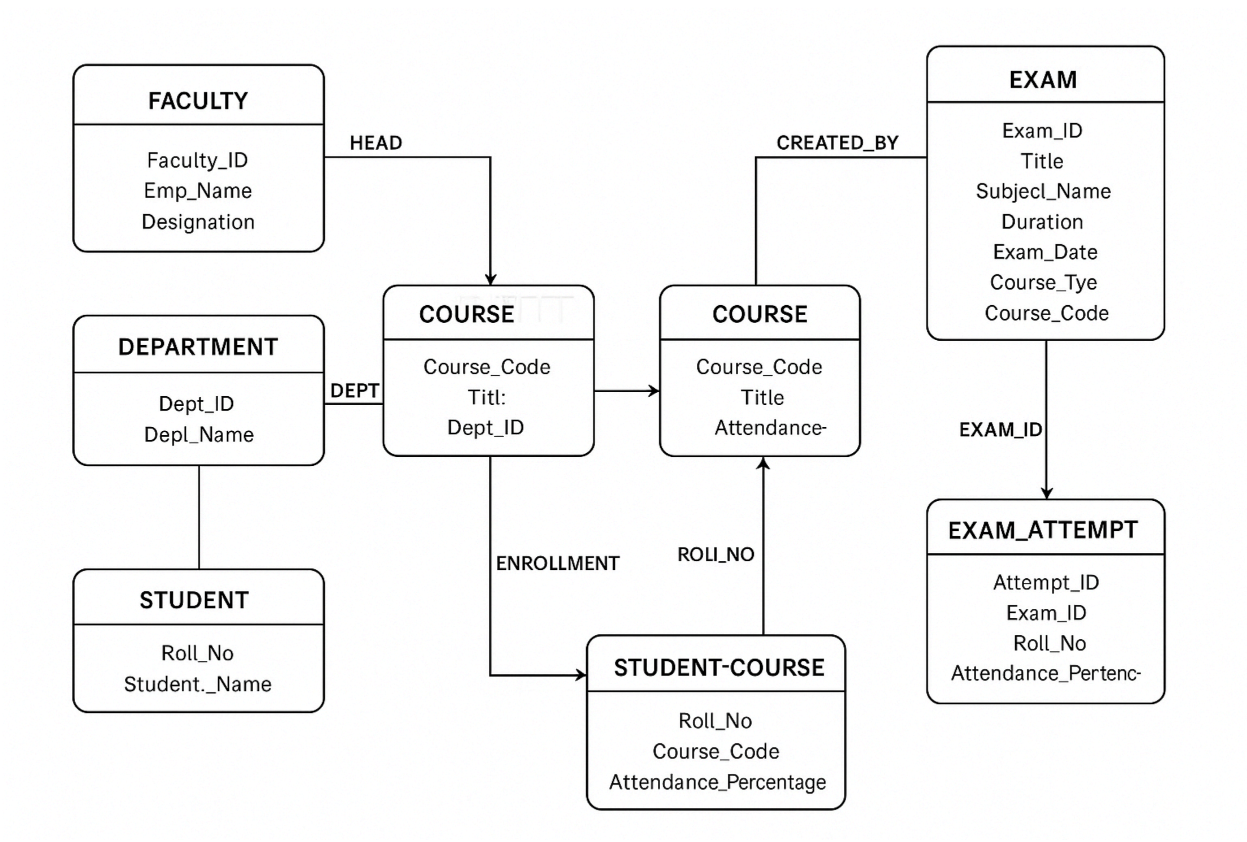
Problem 2: University Examination System

Design an Entity-Relationship schema for a university examination system that manages data about exams, students, faculty members, courses, and departments. Each department has a unique name and is headed by a faculty member. A department can offer multiple courses, and each course has a unique course code, title, and is coordinated by a faculty member.Faculty members have an employee ID, name, and designation. They can teach multiple courses, coordinate specific courses, and also serve as heads of departments.

A faculty member may handle multiple roles at once. Students have a roll number and name, and each student belongs to one department. A student can enroll in multiple courses offered by that department. For each enrolled course, a student has an attendance percentage recorded. Exams are created by faculty members. Each exam has a title, subject name (which is assumed to be the same as the course name), duration, date, type (internal or external), and is always linked to a specific course. Students may appear in multiple exams related to their courses, and for each exam, a student may have multiple attempts, with marks and attempt dates recorded for each. All relationships between students, courses, faculty, and exams must reflect these associations clearly-such as student-course enrollment, faculty-course teaching, course-department mapping, and exam-course ownership.



1.Faculty Table

```
CREATE TABLE Faculty (
   Faculty_ID INT PRIMARY KEY,
   Emp_Name VARCHAR(100),
   Designation VARCHAR(50)
);
```

2. Department Table

```
CREATE TABLE Department (
   Dept_ID INT PRIMARY KEY,
   Dept_Name VARCHAR(100),
   Head_Faculty_ID INT ,
   FOREIGN KEY (Head_Faculty_ID) REFERENCES Faculty(Faculty_ID) );
```

3. Course Table

```
CREATE TABLE Course (
   Course_Code VARCHAR(10) PRIMARY KEY,
   Title VARCHAR(100),
   Dept_ID INT,
   Coordinator_ID INT,
   FOREIGN KEY (Dept_ID) REFERENCES Department(Dept_ID),
   FOREIGN KEY (Coordinator_ID) REFERENCES Faculty(Faculty_ID)
);
```

4. Student Table

```
CREATE TABLE Student (
   Roll_No INT PRIMARY KEY,
   Student_Name VARCHAR(100),
   Dept_ID INT,
   FOREIGN KEY (Dept_ID) REFERENCES Department(Dept_ID)
);
```

5. Student_Course (Enrollment) Table

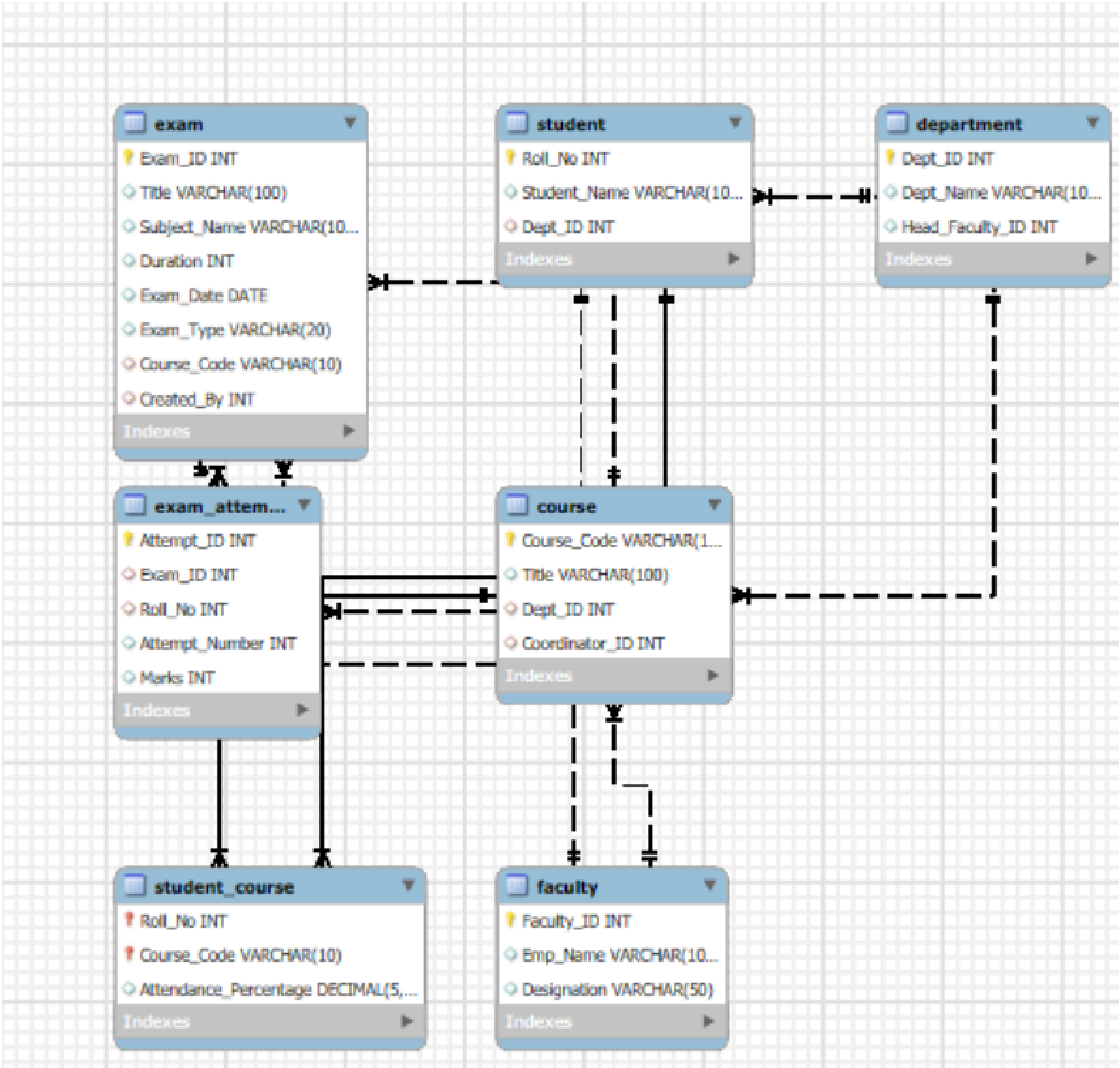
```
CREATE TABLE Student_Course (
   Roll_No INT,
   Course_Code VARCHAR(10),
   Attendance_Percentage DECIMAL(5,2),
   PRIMARY KEY (Roll_No, Course_Code),
   FOREIGN KEY (Roll_No) REFERENCES Student(Roll_No),
   FOREIGN KEY (Course_Code) REFERENCES Course(Course_Code );
```

6. Exam Table

```
CREATE TABLE Exam (
   Exam_ID INT PRIMARY KEY,
   Title VARCHAR(100),
   Subject_Name VARCHAR(100),
   Duration INT, -- in minutes
   Exam_Date DATE,
   Exam_Type VARCHAR(20), -- 'internal' or 'external'
   Course_Code VARCHAR(10),
   Created_By INT,
   FOREIGN KEY (Course_Code) REFERENCES Course(Course_Code),
   FOREIGN KEY (Created_By) REFERENCES Faculty(Faculty_ID)
);
```

7. Exam_Attempt Table

```
CREATE TABLE Exam_Attempt (
   Attempt_ID INT PRIMARY KEY,
   Exam_ID INT,
   Roll_No INT,
   Attempt_Number INT,
   Marks INT,
   FOREIGN KEY (Exam_ID) REFERENCES Exam(Exam_ID),
   FOREIGN KEY (Roll_No) REFERENCES Student(Roll_No)
);
```


exam
Exam_ID INT
Title VARCHAR(100)
Subject_Name VARCHAR(10...
Duration INT
Exam_Date DATE
Exam_Type VARCHAR(20)
Course_Code VARCHAR(10)
Created_By INT
Indexes
student
Roll_No INT
Student_Name VARCHAR(10...
Dept_ID INT
Indexes
department
Dept_ID INT
Dept_Name VARCHAR(10...
Head_Faculty_ID INT
Indexes
exam_attem...
Attempt_ID INT
Exam_ID INT
Roll_No INT
Attempt_Number INT
Marks INT
Indexes
course
Course_Code VARCHAR(1...
Title VARCHAR(100)
Dept_ID INT
Coordinator_ID INT
Indexes
student_course
Roll_No INT
Course_Code VARCHAR(10)
Attendance_Percentage DECIMAL(5,...
Indexes
faculty
Faculty_ID INT
Emp_Name VARCHAR(10...
Designation VARCHAR(50)
Indexes