**University Course Management System**

**Entities and Relationships**

* **Departments**: Faculties like CS, EE, ME, etc.
* **Professors**: Each belongs to a department and can teach multiple courses.
* **Courses**: Offered by departments and taught by professors.
* **Students**: Enrolled in courses.
* **Enrollments**: A junction table that records which student is enrolled in which course and their grade.

**Table Structures and Sample Data**

**1. Departments**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Dept\_ID | VARCHAR2(4) | PRIMARY KEY, starts with 'D' |
| Dept\_Name | VARCHAR2(50) | NOT NULL, UNIQUE |
| Building | VARCHAR2(30) |  |
| Number\_of\_Classrooms | NUMBER(3) | CHECK(Number\_of\_Classrooms >= 0) |

**Sample Data**:

|  |  |  |  |
| --- | --- | --- | --- |
| **Dept\_ID** | **Dept\_Name** | **Building** | **Number\_of\_Classrooms** |
| D01 | Computer Science | Tech Block | 10 |
| D02 | Electrical Engg. | Power House | 8 |
| D03 | Mechanical Engg. | Mech Block | 6 |

**2. Professors**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Prof\_ID | VARCHAR2(5) | PRIMARY KEY, starts with 'P' |
| Prof\_Name | VARCHAR2(50) | NOT NULL |
| Dept\_ID | VARCHAR2(4) | FOREIGN KEY REFERENCES Departments(Dept\_ID) |
| Experience\_Years | NUMBER(2) | CHECK (Experience\_Years >= 0) |

**Sample Data**:

|  |  |  |  |
| --- | --- | --- | --- |
| **Prof\_ID** | **Prof\_Name** | **Dept\_ID** | **Experience\_Years** |
| P1001 | Dr. Meera Nair | D01 | 12 |
| P1002 | Dr. Arjun Rao | D02 | 9 |
| P1003 | Dr. Kavita Singh | D01 | 7 |
| P1004 | Dr. Raj Malhotra | D03 | 15 |

**3. Courses**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Course\_ID | VARCHAR2(6) | PRIMARY KEY |
| Course\_Name | VARCHAR2(100) | NOT NULL |
| Dept\_ID | VARCHAR2(4) | FOREIGN KEY REFERENCES Departments(Dept\_ID) |
| Prof\_ID | VARCHAR2(5) | FOREIGN KEY REFERENCES Professors(Prof\_ID) |
| Credits | NUMBER(1) | CHECK (Credits BETWEEN 1 AND 5) |
| Student\_Count | NUMBER(4) | CHECK (Student\_Count >= 0) |

**Sample Data**:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course\_ID** | **Course\_Name** | **Dept\_ID** | **Prof\_ID** | **Credits** | **Student\_Count** |
| CSE101 | Data Structures | D01 | P1001 | 4 | 2 |
| CSE201 | Operating Systems | D01 | P1003 | 3 | 1 |
| EEE101 | Circuit Theory | D02 | P1002 | 4 | 1 |
| ME101 | Thermodynamics | D03 | P1004 | 3 | 1 |

**4. Students**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Student\_ID | VARCHAR2(6) | PRIMARY KEY, starts with 'S' |
| Student\_Name | VARCHAR2(50) | NOT NULL |
| Dept\_ID | VARCHAR2(4) | FOREIGN KEY REFERENCES Departments(Dept\_ID) |
| DOB | DATE |  |

**Sample Data**:

|  |  |  |  |
| --- | --- | --- | --- |
| **Student\_ID** | **Student\_Name** | **Dept\_ID** | **DOB** |
| S0001 | Anjali Sharma | D01 | 2003-05-14 |
| S0002 | Ravi Kumar | D02 | 2002-11-20 |
| S0003 | Nisha Verma | D03 | 2003-02-02 |
| S0004 | Aman Sheikh | D01 | 2002-07-25 |

**5. Enrollments**

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Constraints** |
| Student\_ID | VARCHAR2(6) | FOREIGN KEY REFERENCES Students(Student\_ID) |
| Course\_ID | VARCHAR2(6) | FOREIGN KEY REFERENCES Courses(Course\_ID) |
| Semester | VARCHAR2(6) | e.g., 'Sem1', 'Sem2' |
| Marks | NUMBER(5,2) | CHECK (MARKS >= 0 AND MARKS < 100) |
| PRIMARY KEY | (Student\_ID, Course\_ID) |  |

**Sample Data**:

|  |  |  |  |
| --- | --- | --- | --- |
| **Student\_ID** | **Course\_ID** | **Semester** | **Marks** |
| S0001 | CSE101 | Sem1 | 88.0 |
| S0001 | CSE201 | Sem2 | 76.5 |
| S0002 | EEE101 | Sem1 | 81.0 |
| S0003 | ME101 | Sem1 | 93.0 |
| S0004 | CSE101 | Sem1 | 68.5 |