



Project Deliverable I

Design of a Normalized Database

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CS313: Intermediate Computer Programming

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## 1. A Normalized Conceptual Diagram

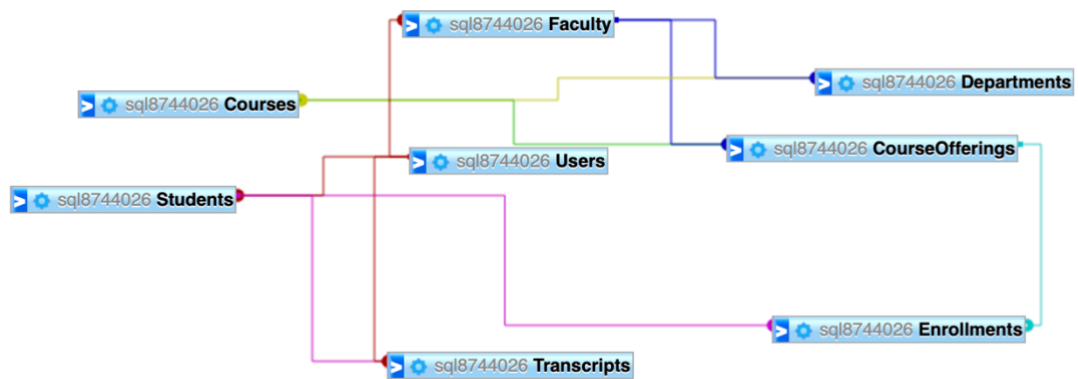


Figure 1: Normalized Conceptual Diagram

### Entities:

1. **Users**
2. **Students**
3. **Faculty**
4. **Departments**
5. **Courses**
6. **Course Offerings**
7. **Enrollments**
8. **Transcripts**

### Relationships:

1. A **User** can either be a **Student**, **Faculty**, or **Administrator**.
2. A **Student** can have multiple **Enrollments**.
3. A **Faculty** is associated with a **Department** and manages **Course Offerings**.
4. A **Department** offers multiple **Courses**.
5. A **Course Offering** is tied to a **Faculty** and is a specific instance of a **Course**.
6. A **Student** can generate **Transcripts** based on their **Enrollments** and performance.
7. An **Enrollment** is linked to a specific **Student** and a specific **Course Offering**.

## 2. A Normalized ER Diagram

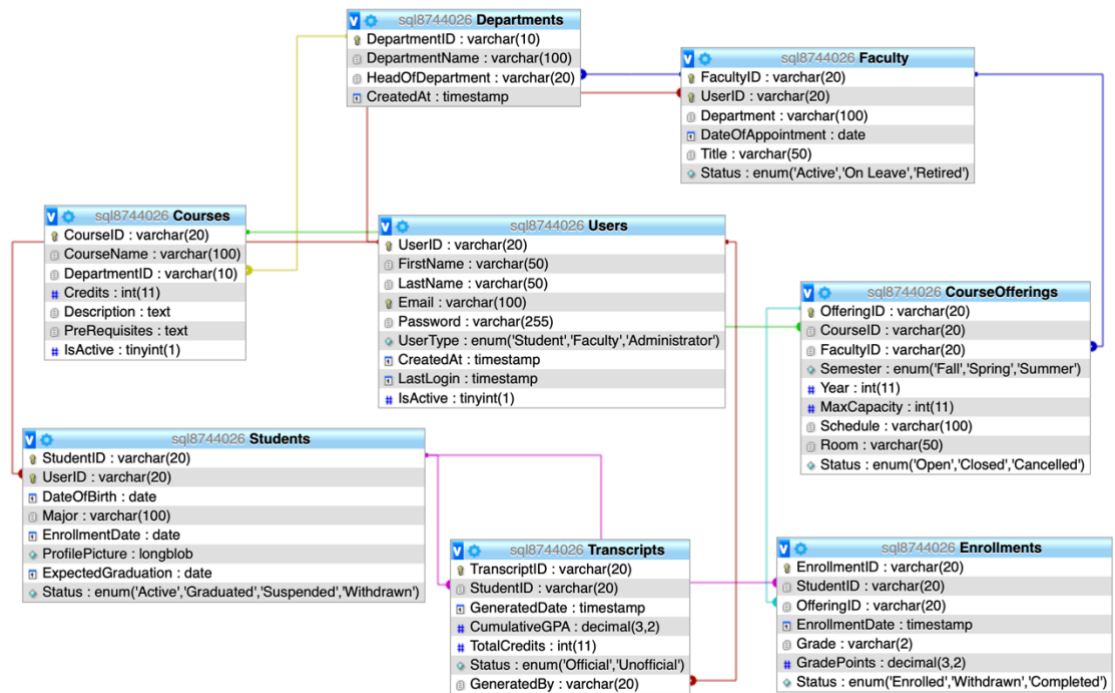


Figure 2: Normalized Entity Relationship Diagram

### Entities:

#### 1. Users

- UserID[PK], FirstName, LastName, Email, Password, UserType, CreatedAt, LastLogin, IsActive

#### 2. Students

- StudentID[PK], UserID[FK], DateOfBirth, Major, EnrollmentDate, ProfilePicture, ExpectedGraduation, Status

#### 3. Faculty

- FacultyID [PK], UserID [FK], Department, DateOfAppointment, Title, Status

#### 4. Departments

- DepartmentID [PK], DepartmentName, HeadOfDepartment [FK], CreatedAt

#### 5. Courses

- CourseID[PK], CourseName, DepartmentID[FK], Credits, Description, PreRequisites, IsActive

## 6. Course Offerings

- OfferingID[PK], CourseID[FK], FacultyID  
[FK], Semester, Year, MaxCapacity, Schedule, Room, Status

## 7. Enrollments

- EnrollmentID[PK], StudentID[FK], OfferingID  
[FK], EnrollmentDate, Grade, GradePoints, Status

## 8. Transcripts

- TranscriptID[PK], StudentID[FK], GeneratedDate, CumulativeGPA, TotalCredits, Status, GeneratedBy [FK]

### Relationships:

1. Users.UserID -> Students.UserID
2. Users.UserID -> Faculty.UserID
3. Faculty.FacultyID -> Departments.HeadOfDepartment
4. Departments.DepartmentID -> Courses.DepartmentID
5. Courses.CourseID -> Course Offerings.CourseID
6. Faculty.FacultyID -> Course Offerings.FacultyID
7. Students.StudentID -> Enrollments.StudentID
8. Course Offerings.OfferingID -> Enrollments.OfferingID
9. Students.StudentID -> Transcripts.StudentID
10. Users.UserID -> Transcripts.GeneratedBy