

# University Management System: Entities, Attributes, and Relationships

## 1. Student

- **Attributes:**
  - **StudentID:** Primary Key
  - **Name:** Full name of the student
  - **Email:** University email address
  - **PhoneNumber:** Contact number
  - **Address:** Permanent address
  - **DateOfBirth:** Birth date
  - **EnrollmentDate:** Date of admission
  - **FacultyID:** Foreign Key [References Faculty]
  - **DepartmentID:** Foreign Key [References Department]
- **Relationships:**
  - Belongs to a **Faculty** (Many-to-One)
  - Belongs to a **Department** (Many-to-One)
  - Enrolls in multiple **Courses** (Many-to-Many via EnrollStudentInCourse)
  - Has multiple **AcademicRecords** (One-to-Many)
  - Has multiple **Grades** (One-to-Many)
  - Has multiple **BookLoans** (One-to-Many)
  - Has a single **Finance** record (One-to-One)
  - Has multiple **Attendance** records (One-to-Many)

## 2. Faculty

- **Attributes:**
  - **FacultyID:** Primary Key
  - **FacultyName:** Name of the faculty (e.g., Engineering, Science)
  - **DeanName:** Name of the Dean of the faculty
- **Relationships:**
  - Contains multiple **Departments** (One-to-Many)
  - Oversees multiple **Courses** (One-to-Many)

## 3. Department

- **Attributes:**
  - **DepartmentID:** Primary Key
  - **DepartmentName:** Name of the department (e.g., Computer Science)
  - **FacultyID:** Foreign Key (References Faculty)
  - **HeadOfDepartment:** Name of the department head
- **Relationships:**
  - Belongs to a **Faculty** (Many-to-One)
  - Offers multiple **Courses** (One-to-Many)
  - Contains multiple **Students** (One-to-Many)
  - Includes multiple **Professors** (One-to-Many)

## 4. Professor

- **Attributes:**
  - **ProfessorID:** Primary Key
  - **Name:** Full name of the professor
  - **Email:** Contact email
  - **DepartmentID:** Foreign Key (References Department)
- **Relationships:**
  - Belongs to a **Department** (Many-to-One)
  - Teaches multiple **Courses** (Many-to-Many via CourseAssignToProfessor)
  - Handles multiple **SectionSchedules** (One-to-Many)

## 5. Course

- **Attributes:**
  - **CourseID:** Primary Key
  - **CourseName:** Title of the course
  - **Credits:** Number of credits assigned
  - **DepartmentID:** Foreign Key (References Department)
  - **SemesterID:** Foreign Key (References Semester)
- **Relationships:**
  - Belongs to a **Department** (Many-to-One)
  - Is offered in a specific **Semester** (Many-to-One)
  - Is taught by multiple **Professors** (Many-to-Many via CourseAssignToProfessor)
  - Has multiple **Students** enrolled (Many-to-Many via EnrollStudentInCourse)
  - Has multiple **AcademicRecords** (One-to-Many)
  - Includes multiple **Attendance** records (One-to-Many)

## 6. EnrollStudentInCourse

- **Attributes:**
  - **EnrollmentID:** Primary Key
  - **StudentID:** Foreign Key (References Student)
  - **CourseID:** Foreign Key (References Course)
  - **SemesterID:** Foreign Key (References Semester)
  - **EnrollmentDate:** Date of enrollment
- **Relationships:**
  - Links **Students** and **Courses** (Many-to-Many)
  - Belongs to a **Semester** (Many-to-One)

## 7. Semester

- **Attributes:**
  - **SemesterID:** Primary Key
  - **SemesterName:** Title of the semester (e.g., Fall 2025)
  - **StartDate:** Start date of the semester
  - **EndDate:** End date of the semester
- **Relationships:**
  - Includes multiple **Courses** (One-to-Many)
  - Includes multiple **Enrollments** (One-to-Many)
  - Covers multiple **AcademicRecords** (One-to-Many)

## 8. AcademicRecord

- **Attributes:**
  - **RecordID:** Primary Key
  - **StudentID:** Foreign Key (References Student)
  - **CourseID:** Foreign Key (References Course)
  - **SemesterID:** Foreign Key (References Semester)
  - **Grade:** Letter grade or score
  - **Comments:** Notes on the student's performance
- **Relationships:**
  - Belongs to a **Student** (Many-to-One)
  - Belongs to a **Course** (Many-to-One)
  - Belongs to a **Semester** (Many-to-One)

## 9. AcademicGrade

- **Attributes:**
  - **GradeID:** Primary Key
  - **StudentID:** Foreign Key (References Student)
  - **CourseID:** Foreign Key (References Course)
  - **GradeType:** Type of grade (e.g., Quiz, Final Exam)
  - **GradeValue:** Value of the grade (e.g., percentage)
- **Relationships:**
  - Belongs to a **Student** (Many-to-One)
  - Belongs to a **Course** (Many-to-One)

## 10. Attendance

- **Attributes:**
  - **AttendanceID:** Primary Key
  - **StudentID:** Foreign Key (References Student)
  - **CourseID:** Foreign Key (References Course)
  - **Date:** Date of the class
  - **Status:** Attendance status (Present/Absent)
- **Relationships:**
  - Belongs to a **Student** (Many-to-One)
  - Belongs to a **Course** (Many-to-One)

## 11. BookLoans

- **Attributes:**
  - **LoanID:** Primary Key
  - **StudentID:** Foreign Key (References Student)
  - **BookID:** Foreign Key (References Books)
  - **LoanDate:** Date of borrowing
  - **ReturnDate:** Date of return
  - **Status:** Status (Returned/Not Returned)
- **Relationships:**
  - Links **Students** and **Books** (Many-to-Many)

## 12. Books

- **Attributes:**
  - **BookID:** Primary Key
  - **Title:** Title of the book
  - **Author:** Author of the book
  - **ISBN:** ISBN number
  - **CopiesAvailable:** Number of copies available
- **Relationships:**
  - Can be borrowed by multiple **Students** through **BookLoans** (Many-to-Many)

## 13. Finance

- **Attributes:**
  - **FinanceID:** Primary Key
  - **StudentID:** Foreign Key (References Student)
  - **SemesterID:** Foreign Key (References Semester)
  - **TotalFees:** Total fees for the semester
  - **PaidAmount:** Amount paid
  - **DueAmount:** Remaining balance
- **Relationships:**
  - Belongs to a **Student** (One-to-One)
  - Covers a specific **Semester** (Many-to-One)

## 14. LectureClassroom

- **Attributes:**
  - **RoomID:** Primary Key
  - **RoomName:** Name of the classroom
  - **Capacity:** Maximum seating capacity
  - **Location:** Building or floor information
- **Relationships:**
  - Hosts multiple **LectureSchedules** (One-to-Many)

## 15. LectureClassSchedule

- **Attributes:**
  - **ScheduleID:** Primary Key
  - **CourseID:** Foreign Key (References Course)
  - **ProfessorID:** Foreign Key (References Professor)
  - **RoomID:** Foreign Key (References LectureClassroom)
  - **DayOfWeek:** Scheduled day (e.g., Monday)
  - **StartTime:** Class start time
  - **EndTime:** Class end time
- **Relationships:**
  - Belongs to a **Course** (Many-to-One)
  - Is assigned to a **Professor** (Many-to-One)
  - Takes place in a **LectureClassroom** (Many-to-One)

