**A logo of a university

AI-generated content may be incorrect.**

**University Course Enrollment & Management System**

|  |  |  |
| --- | --- | --- |
| **Name** | **ID** | **Rule** |
| **Abdallah Osama Gaber Mansour** | **20221460119** | **Task1:** **Database Design, Queries, ERD and Schema** |
|  |  |  |
|  |  |  |
|  |  |  |

**Schema**

**A screenshot of a computer

AI-generated content may be incorrect.**

**Core Tables**

* **Departments**: Stores department details (name, building, office) and links to the department head (faculty member).
* **Faculty**: Contains faculty information (name, contact, title) with the mandatory department association.
* **Students**: Tracks student records (personal info, enrollment year) and their assigned department.
* **Courses**: Defines course offerings (code, title, credits, level) with department affiliation.

**Academic Operations**

* **Course\_Offerings**: Represents scheduled course instances with faculty, term, time, and classroom assignments.
* **Enrollments**: Manages student registrations, grades, and enrollment status for each course offering.

**Facilities**

* **Classrooms**: Stores room details (capacity, lab status, projector availability) for scheduling.

**Relationships**

* Departments, faculty, students, and courses are linked through department IDs.
* Faculty teach course offerings, which students enroll in via the enrollments table.
* Course offerings are assigned to classrooms for scheduling.

**DB Creation**

A screenshot of a computer

AI-generated content may be incorrect.

* Create the UniversityDB database if it doesn't already exist

A screenshot of a computer screen

AI-generated content may be incorrect.

* Sets up database security with a login/user having full ownership to Provide controlled access with administrative privileges
* Then Clearing the data , ensuring that the script is runnable.

A screenshot of a computer program

AI-generated content may be incorrect.

* Drop foreign key constraints before dropping tables IF Exist

A white background with black and blue text

AI-generated content may be incorrect.

* Clears existing tables starting with most dependent ones IF Exist

**Creating Our Tables**

A screenshot of a computer program

AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.

A computer code with text

AI-generated content may be incorrect.

**Inserting Data**

A screenshot of a computer

AI-generated content may be incorrect.

* First checking if the data already exists
* Then insert
* Then update the head of head\_of\_departement

head\_of\_departement updates are performed separately after inserting both Departments and Faculty data because of **circular dependency** between these two tables.

1. **Departments table** has a head\_of\_departement column that references faculty\_id
2. **Faculty table** has a departement\_id column that references departement\_id

* we can't insert a Department with a head\_of\_department before the Faculty exists
* we can't insert Faculty with department\_id before the Department exists

A screenshot of a computer program

AI-generated content may be incorrect.

* After inserting in All the tables we check the result

A screenshot of a computer

AI-generated content may be incorrect.A screenshot of a computer

AI-generated content may be incorrect.

**Advanced Queries**

A screenshot of a computer program

AI-generated content may be incorrect.

* Identifies students with heavy course loads
* Joins Students with Enrollments to count courses per student
* Groups by student and filters with HAVING for >3 enrollments
* Returns student names and their course count

A white rectangular object with a white border

AI-generated content may be incorrect.

A screenshot of a computer code

AI-generated content may be incorrect.

* Shows academic workload by department
* Joins Departments with their Courses
* Calculates average credits using AVG()
* Groups results by department for comparison

A screenshot of a computer data

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

* Identifies the most popular instructor/course combination
* Chains joins from Faculty to Enrollments through Course\_Offerings
* Counts enrollments per faculty/course
* Returns top result by enrollment count

A screenshot of a computer

AI-generated content may be incorrect.

* Finds inactive students
* Uses LEFT JOIN to include all students
* WHERE clause filters for null enrollments (no matches)
* Simple output of student names only

A screenshot of a computer

AI-generated content may be incorrect.

* Identifies largest department by enrollment
* Joins Departments with their Students
* Counts students per department
* Returns department with highest count

A screenshot of a computer

AI-generated content may be incorrect.

* Finds unpopular/unoffered courses
* Double LEFT JOIN from Courses to Enrollments
* WHERE filters for null enrollments
* A screenshot of a computer code

  AI-generated content may be incorrect.Shows course titles only
* Provides department activity metrics
* Complex join across 5 tables
* COUNT(DISTINCT) ensures accurate student counts
* SUM() aggregates all credits for the department
* Comprehensive department-level reporting\

A screenshot of a computer

AI-generated content may be incorrect.

A screenshot of a computer

AI-generated content may be incorrect.

* Identifies large classrooms
* Subquery calculates average classroom capacity
* Main query filters for rooms larger than average
* Returns full classroom details for scheduling purposes

A screenshot of a computer

AI-generated content may be incorrect.

**Views**

A screenshot of a computer program

AI-generated content may be incorrect.

Ensures clean slate for view creation

A screenshot of a computer program

AI-generated content may be incorrect.

* Tracks student academic progress

**Data Relationships**:

* Links students to their enrollments
* Connects enrollments to course offerings
* Joins offerings to course details  
  **Output Fields**:
* Student identification info
* Course identification info
* Academic status (grades, enrollment status)
* Temporal data (enrollment date)

A screenshot of a computer

AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.

* Monitors faculty teaching workload
* Uses LEFT JOIN to include courses with zero enrollments
* Aggregates student counts per course
* Preserves all faculty teaching assignments

**Metrics**:

* Instructor identification
* Course identification
* Enrollment counts as workload indicator

A screenshot of a computer code

AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.

* Provides department-level summary

**Complex Joins**:

* Links department to its head (via faculty\_id)
* Counts all faculty in department (separate join)
* Counts all students in department

**Metrics**

* Department identification/location
* Leadership information
* Faculty and student counts

A screenshot of a computer

AI-generated content may be incorrect.

A screenshot of a computer program

AI-generated content may be incorrect.

* Validates view creation and data