

Advanced Database Project Instructions

Project Title:

University Course Enrollment & Management System

Database System:

Microsoft SQL Server

Project Description:

You are required to build a complete database system for managing university course enrollment. The system should include the following components:

- Table creation and relationships
- Views
- Stored procedures
- Scalar functions
- Triggers
- Transactions
- Indexing
- User permissions

Each team must deliver a working SQL Server database with clear documentation.

Team Structure:

Each team will consist of 4 members. Below are the responsibilities for each member.

Member 1: Database Design and Queries

- Design the database schema and create all necessary tables.
- Populate the tables with realistic sample data.
- Write advanced SQL queries using: Joins, Subqueries (nested queries), GROUP BY and HAVING, Aggregation functions
- Create at least two SQL views (student progress, instructor load).

Member 2: Functions, Procedures, and Triggers

- Create at least one scalar-valued function (For Example to: return course name by ID).
- Write at least one stored procedure (For Example: apply discounts on enrollments).
- Implement at least one AFTER UPDATE trigger to log student name changes and one INSTEAD OF trigger.
- Use proper input/output parameters and error handling.

Member 3: Transactions and Concurrency

- Simulate transactions using: BEGIN TRANSACTION, SAVEPOINT, COMMIT and ROLLBACK
- Demonstrate a dirty read or lost update problem.
- Add examples showing different isolation levels.
- Explain how concurrency issues are solved using SQL Server techniques.

Member 4: Indexing and Security

- Create indexes on frequently searched columns.
- Use GRANT and REVOKE to assign user roles and permissions.
- Use sequences or identity columns to generate primary keys.
- Compare performance with and without indexes.

Submission Requirements:

A complete .sql file with: Table creation, All queries, views, triggers, procedures, functions, and transactions

A PDF report that:

- Documents each section
- States who did what
- Includes screenshots of working queries and output with Proper code comments and formatting

Deadline:

14/5/2025