CS 450-003 Database Concepts
Fall 2022

Course Description

This course covers basics to intermediate knowledge for the design, implementation, and use of relational database systems. The main topics include the relational data model, Entity-Relationship (ER) model for database design, Relational Algebra, SQL, database programming, functional dependencies and normalization. Students will practice to design, develop, and implement a relational ORACLE database and use the database for queries, transaction processing, and report generation.

Course Outcomes

- Knowledge of fundamental concepts of file and database management.
- Knowledge of database design principles, and ability to model real-world environments using the ER model.
- Knowledge of the formal principles of the relational database model and its query languages, and ability to design relational databases and express queries in the relational algebra and calculus.
- Knowledge of the Structured Query Language (SQL) and database programming principles, and ability to author SQL queries and implement Java database applications using the Oracle database system.
- Knowledge of the basic principles of the mathematical theory of database design, and ability to design databases that adhere to Boyce-Codd Normal Form.
- Experience in the complete database creative process: from database design, to database construction, to database programming.

Class Time & Location

TR 1:30-2:45 PM Enterprise Hall 178

Textbook

Required:

- Fundamentals of Database System (7th Edition) by Ramez Elmasri and Shamkant B. Navathe

Recommended:

- Oracle 10g Programming: A Primer by Sunderraman
- NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence by Sadalage and Fowler

Instructor

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Prerequisites

C or better in CS 310 (Data Structures) and CS 330 (Formal Methods and Models)

Disability Accommodations

If you are a student with a disability and you need academic accommodations, please notify me and contact the Office of Disability Services (ODS) at 993-2474, http://ods.gmu.edu. All academic accommodations **must** be arranged through the ODS.

Honor Code Statement

Please be familiar with the GMU Honor Code. In addition, the CS department has its own Honor Code policies. Any deviation from this is considered an Honor Code violation. All graded work must be your own effort. Any attempts at cheating will not be tolerated, and will be turned in to the Honor Committee with significant penalty recommended. **The usual recommendation is grade F for the course**.

Grading Weights

Class participation: 5%
Quizzes: 10%
Projects: 35%
Midterm: 25%
Final exam: 25%

Grading Policy

- All projects must be submitted on Blackboard.
- You have a budget of 3 late days which you can use for projects. No late work accepted otherwise.
- The lowest quiz score for the semester will be dropped.
- Grades will be changed only when a grading error has been made. All grade change requests are due **within a week** of the grade becoming available on Blackboard. After that week, the window to contest a grade has closed other than recording errors.

- No make-up of exams or quizzes unless **previously** arranged with the instructor.
- **Unexcused absence** from the final exam will result in 0 for the final exam.
- If any extra credit is available, it might be available on specific quiz, exam or assignment, but not as an end-of-semester batch of extra work.

Grading Scale

A^+	>98
A	92-98
A^-	90-92
B^+	88-90
B	82-88
B^-	80-82
C^+	78-80
C	72-78
C^-	70-72
D	60-70
F	<60

Tentative Course Outline

Introduction to database concepts
ER & EER model
Relational data model
ER & EER to relational mapping
Relational algebra
SQL
Midterm exam
Database Programming
Functional dependency and normalization
NoSQL
Final exam

Helpful Comments

Welcome to CS 450-003! This class is very interesting and helpful. However, a lot of material will be covered and many new concepts will be introduced. To get the full benefit of the class, I would recommend you to work on the class materials regularly. For example, come to class regularly, participate in group exercises and discussions, review my slides after class, and start

working on the assignments as soon as they are available on Blackboard. They often take more time than you estimate. From my experience, time management is essential to the success of this course. Good luck!