CS 450-002 Database Concepts
Fall 2020

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, and indexing. 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

MW 1:30 PM Blackboard Collaborate Ultra

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
Dr. Ping Deng
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Office hours: MW 3-4PM Blackboard Collaborate Ultra

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. Any attempts at cheating will not be tolerated, and will be turned in to the Honor Committee with significant penalty recommended.

Grading Policies
Quizzes: 20%
Projects: 40%
Midterm: 20%
Final exam: 20%

All projects must be submitted on Blackboard.
All quizzes, midterm, and final exam will be conducted on Blackboard.
You have a budget of 3 late days which you can use as you wish for projects.
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.

Tentative Course Outline
Introduction to database concepts
ER & EER model
Relational data model and ER & EER to relational mapping
Relational algebra
SQL
Midterm exam
Database Programming
Functional dependency and normalization
Storage and indexing
Transaction Processing
NoSQL
Final exam

Helpful Comments
Welcome to CS 450-002! This class is very interesting and helpful. However, a lot of material will be covered and many new concepts will be introduced. To get full benefit of the class you have to work on the class materials regularly. For example, watch my pre-recorded videos before coming to class, review my slides after class, participate in online discussions, and start working on the assignments as soon as they are available on Blackboard. Plan to spend 10 hrs a week on this class. Good luck!