

## CS 4400 Introduction to Database Systems

GTL Summer 2022

### Instructor

Aibek Musaev [aibek.musaev@gatech.edu](mailto:aibek.musaev@gatech.edu)

### Course Description

We introduce the fundamental concepts necessary for the design and use of modern database systems in today's large-scale enterprise applications. We examine the concepts in the order that we typically encounter them in the actual database design process. We start with the problem of conceptually representing data that is to be stored in a database. From there, we see how the data in a conceptual data model can be converted to a database specific model (e.g., the relational data model). We also discuss various forms for relations that possess good properties. We see how to use the relational database language SQL to define the relations and to write SQL statements to insert, delete, retrieve, and update the data. We also examine some of the fundamental storage structures that are used in relational database systems. We end the course with a discussion of some advanced topics in the database management area.

### Grading

- Projects (Phases 1 through 3): **25%** (Phase 1 is approximately half the weight of Phases 2 & 3)
- Mini-Exams (Exam 1 through 8): **50%** (This includes keeping only the best 6 out of 8 Exam scores)
- Comprehensive Final Exam (including Relational Algebra): **15%**
- Submission of peer reviews in CATME: **1%**
- Peer review scores in CATME: **9%**
- In-Class Exercises: **0%** but may be used to help determine if a grade increase is warranted at the end of the course.

Grade Cutoffs: A: 90.0, B: 80.0, C: 70.0, D: 60.0 (grades will not be rounded)

### Late Submission Guidelines:

- Submissions up to 24 hours late will result in your final score being limited to a maximum of 85% of the total possible score
- Submissions up to 48 hours late will result in your final score being limited to a maximum of 70% of the total possible score
- Submissions beyond 48 hours will not be accepted

### Team Project

You will design and implement a database application using the MySQL Relational Database Management System available, which is freely available online. **The Project must be completed as a team of 3-4 students.** You are allowed to form teams across different sections of the class. It is important to understand that we expect the high quality that can come from a team working together, coordinating, and thoroughly testing their system. Good teamwork requires strong collaboration and does not equate to simply dividing the work across the team and expecting a good result. We will allow you to self-form teams through the start of Week #3. I'll close the "self-formation" period at the start of Week #3 so that I can then help form teams with the remaining students before the start of Week #4, which is when Phase #1 of the Project will be published.

We will follow a typical database design methodology for the Project. Notes describing the methodology will be available. The Project will consist of 3 mandatory phases (deliverables/phases I through III). The Project Phases will be:

- **Phase 1:** Develop or review an (Extended/Enhanced) Entity-Relationship Diagram (EERD) and Information Flow Diagram (IFD) based on the Problem Description
- **Phase 2:** Develop a set of Relational Schema and SQL Physical Schema based on an approved Entity Relation Diagram
- **Phase 3:** Develop the Structured Query Language (SQL) views, queries and transactions needed to support an application

### **CATME Team Peer Evaluations/Assessments**

For each phase of the project, each team member will submit a peer evaluation of the other team members. This evaluation will be taken into account when determining the grade for each team member. If all team members do a reasonably equitable amount of work, then each will receive the same grade for that phase of the project. On the other hand, if some members do not do an equitable share of the work (i.e. "carry their weight"), then those member's grades for that phase might be lowered based on the CATME rankings. Completion of the CATME Evaluation Surveys count towards each individual's overall course score.

Also, if a member of the team does not "carry his/her weight" during a phase of the project, then the team may request a "group switch" for that person at the end of Phase 1 or Phase 2 only. This is not to be done lightly, and you really should make the effort to work together and resolve issues whenever possible. The Course Instructor must be notified of this request.

### **Project Collaboration**

Students within a project team are definitely allowed to collaborate closely with each other while working as a team for each phase of the project. No collaboration of any kind whatsoever is allowed outside the team except as noted here. Students are allowed to consult with the current TAs and Instructor. Students are expressly forbidden to collaborate across teams or to collaborate with others outside of the course. Any violation of this policy will be reported to the Dean of Students without exception.

### **Professionalism**

I expect every student to behave in a professional manner befitting Georgia Tech. Your behavior matters, and poor behavior can result in severe consequences for you as a student. I expect you to be aware of and abide by Georgia Tech's Code of Conduct, which includes the Academic Code of Conduct. Lack of professionalism that specifically crosses over into areas of academic misconduct (or that results in significant violations of any aspect of the GT Code of Conduct) will likely be referred to the Dean of Students Office.

### **Academic Integrity and Collaboration**

We expect academic honor and integrity from students. Please study and follow the academic honor code of Georgia Tech: <https://policylibrary.gatech.edu/student-affairs/academic-honor-code>. You may collaborate on homework assignments and daily work, but your submissions must be your own. You may not collaborate on exams.

### **Regrade Policy**

To contest any grade you must contact the instructor **within one week of the assignment's original return date**. The original return date is the date the exam was first made available for students to pick up or the grade was posted online. After that point regrade requests will not be accepted.

## **Prerequisites**

Basic programming skills. Knowledge of GUI programming is helpful.

## **Course Materials**

- Required Text: Fundamentals of Database Systems, 7th (or 6th) edition, Elmasri & Navathe, Addison-Wesley, 2016.

*An online edition of book might be available (180 days rental for \$44.99, lifetime at 74.99) at the following approved site by the publisher Pearson:*

[Fundamentals of Database Systems 7th edition | 9780133970777, 9780133971224 | VitalSource](#)

- Chapter by Chapter Slides
- Database Design Methodology Notes
- Sample Quizzes

## **Canvas**

All course information and resources will be provided in Canvas. This includes: Syllabus, Assignments, Submissions, Announcements, Grades & Feedback, Resources, etc.

The code from each lecture will be posted on Canvas under the Files tab by the end of the following day. Canvas is not forgiving about due dates and times. The assignment folder will close and you are not allowed to turn in your work any other way.

## **Attendance**

Attendance in class every day is expected and required. If you anticipate missing class you must inform your instructor in advance. If you are sick you must let them know as soon as possible so that you can make up the class material.