Introduction to Database Systems

CS 4400 Syllabus

Summer 2026

INSTRUCTOR:

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Office: **TBA** Office Hours: **TBA**

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, including a discussion about secure computing as it relates to database systems and ways to improve the efficiency of these systems.

COURSE OBJECTIVES:

By the end of the semester the student will be able to

- Design and build a database based on a given scenario.
- Write software to manipulate a database using the SQL query language.
- Write software to query a database using the SQL query language.
- Discuss the advantages and disadvantages of storing data in a relational database.

REQUIRED COURSE MATERIAL

- Fundamentals of Database Systems, 7th (or 6th) edition, Elmasri & Navathe, Addison-Wesley, 2016. An electronic version of the text is acceptable. There will be readings from this book linked with lectures, so you may want to have a copy.
- Dr. McDaniel's slides will be provided
- Handouts will be made available and are required reading.

GRADING DETAILS:

- 5 percent of your grade is from class participation
- 30 percent of your grade is from group projects. The course project is broken up into 3 mandatory phases, each of which will count for 10% of your grade.
- 45 percent of your grade is from midterm exams. The course will have 3 midterm exams throughout the course of the semester that are worth 15% each.
- 20 percent of your grade is from one of these options: The grade you make on the final exam which is given during the final exam time slot or the average of your other 3 midterm exams.

Standard letter grade cutoffs apply - I do not round grades:

- A: 90% and above of the total course points
- B: 80% and above of the total course points
- C: 70% and above of the total course points
- D: 60% and above of the total course points
- F: less than 60% of the total course points

COURSE PROJECT

You will work as a team to design and implement a database application using the MySQL Relational Database Management System. It is important to understand that we expect high-quality deliverables that should come from a team working together to design, implement, and test their system. Good teamwork requires strong collaboration, and does not equate to simply dividing the work across the team members, and then working separately while expecting a good result.

The project must be completed as a team of four students. You are allowed to "self-form" teams. Later, I'll close the "self-formation" period so that I can form teams with all of the remaining students.

We will follow a typical database design methodology for the project. Notes describing the methodology will be provided. The project will consist of three mandatory phases:

- Phase 1: Develop an Extended/Enhanced Entity-Relationship Diagram (EERD) based on the provided project requirements.

- Phase 2: Develop a set of Relational Schema and SQL Physical Schema based on a provided EERD; also, transform and upload a provided dataset into your database.

- Phase 3: Develop the Structured Query Language (SQL) views, queries, and transactions needed to support an application based on a provided database and dataset.

Project Late Submission Guidelines

Late submissions will result in points being deducted from your score. Please let me know if you are planning to submit an assignment late per this policy. Project phases up to 24 hours late will result in your final score for that assignment being reduced by 10 points.

Submissions beyond 24 hours late will not be accepted, resulting in a score of zero (0).

ATTENDANCE POLICY

- 5 percent of your grade is from the daily assignments that open and close at varying times during lecture. It is expected that you are in class and completing these. If you miss a few classes you can make the associated daily activities up during the TA office hours at any time before the next exam. (This makeup option can be used to make up 5 or less missed days from the semester).

- All exams are given in person only.

ACADEMIC INTEGRITY

The work you submit for this class must be your own work. Project phases must be the work of your group only. You may not look at other groups' submissions for ideas. You may not look at past projects done for this class for ideas. You may not use ChatGPT or any other AI Tool to help you with the project, the exams, or any other assignment in the course. The project, in particular, is a creative endeavor and must be fundamentally designed from scratch by your group alone.

We will be using plagiarism detection methods throughout this course. Plagiarism or any other violation of academic integrity will result in your being reported to the Office of Student Integrity. The Georgia Tech Student Code of Conduct will be strictly enforced.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.