CS 4400 – Introduction to Database Systems
Syllabus – Summer 2026
Section RBR: In-Person Attendance, Berlin Summer Abroad Program

Course Description: Comprehensive coverage of mainstream database concepts such as the entity-relationship model, relational databases, query languages, and database design methodology.

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 develop, implement and test queries, views, functions and stored procedures to support a problem-scenario driven database management system. We also examine some of the fundamental storage structures that are used in relational database systems. Finally, we end the course with a discussion of some advanced topics in the database management area.

Course Objectives/Learning Outcomes:
1. Develop and test single- and multi-table Structured Query Language (SQL) queries
2. Describe data scenarios using entities, relationships, attributes, keys, and related relational concepts
3. Demonstrate how key, entity, and referential integrity concepts are implemented at the database level
4. Translate Entity Relationship Designs (ERDs) into valid relational schema
5. Discuss the integrity management and performance tradeoffs between different relational schema options
6. Determine if a relational design is non-normalized, or in the First, Second and Third Normal Forms (1NF – 3NF)
7. Implement and test tables, queries, views, functions, and stored procedures as part of a Database Management System
8. Generate relational algebra expressions that are equivalent to a given sequence of SQL queries and actions
9. Demonstrate how locking, logging and similar techniques can be used to support transactions and ACID properties
10. Discuss how various data structures can be used to implement database system-level elements and functions

Course Materials:
- All course materials will be provided through the course site on Canvas, Piazza, online access to the Georgia Tech Library, and Georgia Tech GitHub as required.
- [optional] Fundamentals of Database Systems, Elmasri & Navathe, Addison-Wesley, 7th Ed (2016), ISBN-13: 9780133970777
- Electronic versions are available at the VitalSource Website for 180-day eTextbook License (~$65 USD)

Course Prerequisites:
A grade of D or higher in CS 1301 Intro to Computing; CS 1315 Intro to Media Computation; or, CS1371 Computing for Engineers.

Grading Policies & Weighting:
The course has projects, various types of quizzes, two major exams, and participation-based aspects:
- [60%] Mini-Exams (6 total, *all scores count - see Final Exam**)
- [20%] Course Project Phases (6 total, *best 5 out of 6 scores count*)
- [15%] Project Participation (*based primarily on the CATME Feedback Surveys*)
- [5%] In-Class Concept Quizzes (12 total, *best 10 out of 12 count*)

1. Final grades will use the scale: [100:90] = A, (90:80] = B, (80:70] = C, (70:60] = D, (60:0] = F.
2. Final scores will NOT be "automatically rounded" to the next higher grade level.
3. We do not assign last minute "makeup work", so plan to do your best on the assignments as currently listed in the schedule.
4. All assignment and project info (e.g., policies, due dates, and submission requirements) will be listed on Canvas.

5. **The Final Exam will NOT be a distinct assessment. Instead, you'll be allowed to select up to three of your previous Mini-Exams and retake them during the Final Exam period.** Also, you are not required to select the three exams with the lowest scores - you may select the exams that you believe will give you the best opportunity to improve your course score.

Attendance Policies:

6. **Class attendance is required.** If you need to miss class for a legitimate reason, please send an email to the instructor before class. Legitimate reasons for missing class include illness. Travel is not a legitimate reason.
7. **You must take all exams and quizzes in class**, unless expressly permitted by the instructor - for example, for ODS accommodations.
8. **Each unexcused absence can result in your maximum course score being reduced by 5%.** As an example, one unexcused absence reduces the possible overall course score to a maximum of 95%.
9. The project will be divided into multiple phases, and you will work as part of a team to complete each phase. You must coordinate with your teammates to determine the best times for you all to collaborate. It is essential that you **let your teammates know as early as possible about any availability and/or participation problems**.
10. If you are required to quarantine and/or isolate yourself from the rest of the community (e.g., COVID based reasons), then we will coordinate with you to ensure that you receive your educational opportunities with minimal impact.
11. If truly exceptional and/or catastrophic circumstances arise, then please let us know immediately, and also feel free to contact The Dean of Students with the details. They are much better equipped to verify these situations than we are in our individual courses. Also please consult the Georgia Tech policies on Incompletes, Withdrawals, etc. as needed.

Assignment Submission Policies:

12. We recommend that you **configure your time zones in Canvas appropriately**, so that you can see all deadlines in our local Berlin time zone. Being aware of the time zone differences is your responsibility - late submissions will not be excused because of time zone misunderstandings/configuration issues
13. **Submissions must be made via Canvas**; and, if Canvas is down, then you must alert the instructor and TA via e-mail before the deadline/due date, and submit your files via e-mail or some alternate method.
14. **It is your responsibility as the student to check (and double-check) your submission to ensure that all files have been uploaded and received by Canvas**. Please feel free to take a screenshot showing the date of submission and the list of files uploaded for your records just in case. Also, almost all of the assignments allow for multiple uploads before the Due Date, so you can also upload all of the required deliverables/files again if you have any doubts about the validity of the original upload.
15. If you miss an exam or a homework assignment without a valid excuse, then you will receive a zero (0) for that event.
16. Only Dean's Office/Institute-level exceptions will be made for missed exams or homework assignments.
    a. All situations must be referred to the Dean of Students Office (https://studentlife.gatech.edu/request-assistance) for verification.
    b. Events such as *vacations*, *weddings*, *graduations*, *errands*, *work conflicts*, *sleeping through your alarm*, *alarm malfunctions*, *forgetting to submit*, *forgetting the date or time of an exam*, or *not being aware of the assignment* are all ***NOT valid excuses***.
    c. Documented *incapacitating illness*, *death in the immediate family*, *judicial procedures*, *military service*, or *official school functions,* and *properly documented religious holidays* are considered ***valid excuses***.
    d. All official Georgia Tech documentation must be forwarded to the professor as soon as possible. That documentation must be provided on letterhead with the signature of a physician, supervisor, or other appropriate official. Additionally, the documentation must encompass the date(s) of any assignment for which you are requesting an exception.
17. **The final decision regarding any request for an exception is made solely at the discretion of your professor.**
18. If you take an exam, we will assume you are well enough for your performance to accurately reflect your knowledge. You will NOT be allowed to retake the exam after the fact based on reasons along the line of "...I didn't feel well at the time...".

19. You must inform your professor(s) the first week of the semester in writing if you will be observing any religious holidays during the semester, especially if they conflict with any of the exam or project presentation dates.
20. **Late submissions will result in your final score being limited to a maximum of the total possible score**. There's no need to alert us or request permission if you are planning to submit an assignment late per this policy.
    a. Up to 24 hours late will result in your final score being limited to a maximum of 85% of the total possible score
    b. Up to 48 hours late will result in your final score being limited to a maximum of 70% of the total possible score
    c. Submissions beyond 48 hours late will not be accepted, resulting in a score of zero (0).
21. **Missed presentations, quizzes and exams due to unexcused absences will receive a grade of zero (0)**.

Regrade Request Policies:

22. Once graded phases and/or quizzes are returned, there is a one-week deadline during which you can contest your grade. This clock starts when the papers are returned (e.g. posted on Canvas), so please remember your responsibility to check Canvas frequently.
23. You may request a regrade of your assignment if you feel that it is warranted through the following process:
    a. A regrade request begins by making your request to the TA.
    b. Regrade requests are valid if - and only if - they address one or more aspects of the assignment which are factually in error. Requests based simply on the desire for a higher grade (e.g. "We think that we shouldn't have lost that many points for that error…") will not be supported.
    c. Your request must identify the specific aspects that you believe should be re-evaluated and must also include the reasons why you feel the re-evaluation is warranted.
24. Please be aware that if you submit your assignment for re-evaluation, then the TA (or Instructor) is allowed to consider and re-evaluate the entire assignment as required to ensure that the overall evaluation, and the corresponding grade, is fair and consistent.
25. Finally, if you do not feel your issue has been resolved after contacting the TA, then you may escalate the issue by emailing your instructor.

Class Participation Policies:

26. Class participation will be determined by several factors:
    a. Contributions on Piazza, especially providing solid and well thought-out responses to fellow student's questions
    b. **Do not post potential answers to assignments on Piazza!** If you are in doubt whether posting a particular piece of information might violate this rule, then begin by making it a private post to the TAs and instructors only.
    c. Actively participating and providing substantial contributions to your team during the group phases. **Your ratings and comments on the CATME surveys are absolutely critical to earning a solid score on your project participation!!**
    d. Other "above-and-beyond" initiatives that you take to improve the learning atmosphere for the course as judged by the instructor(s) and TAs
27. Recordings of lecture, lecture materials and other artifacts are copyrighted by your instructors. **No non-educational reproduction of any materials, including lecture records and recordings, is permitted.**

Academic Honesty & Integrity Policies and Statements:

Students are expected to abide by the Georgia Tech Honor Code and academic policies as specified in the Georgia Tech Catalog.

28. Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Every student is expected to read, understand and abide by the Georgia Tech Academic Honor Code: (https://policylibrary.gatech.edu/student-life/academic-honor-code)
29. 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: (https://osi.gatech.edu/process/academic-misconduct-process).

30. A common subject that is relevant is the subject of collaboration:
    a. You are to complete all assignments yourself, unless the assignment instructions explicitly state otherwise.
    b. You are allowed to consult with the TA and Instructors.
    c. You should feel free to discuss the assignments with your classmates at a conceptual level, but you must not copy any specific solution elements – either complete or partial lines of text or code – from your classmates.
    d. 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 other collaboration of any kind whatsoever is allowed outside the team except as noted here.
    e. Students are expressly forbidden to collaborate across teams or to collaborate with others outside of the course, including (and especially) on exams.

    All violations will be reported to the Office of Student Integrity at the discretion of the instructor.
31. **Any use of AI / ML tools like ChatGPT, Copilot or otherwise to generate assignment solutions (or parts thereof) is strictly prohibited**.
32. **If you do copy** specific lines or text and/or code from another source - classmate, text, website, etc. - **then you must clearly document the beginning and end of the copied portion, and cite the details of the source** (e.g. name, address/URL, date, etc.) to avoid a violation of the Academic Honor Code.
33. If you post your assignment work on any publicly accessible websites (including but not limited to GitHub), and your materials are subsequently copied and used by other students, then you will very likely be held responsible for fostering unwarranted collaboration.
34. You are welcome and encouraged to form informal study groups at any time, but please do not form formal project teams for the group assignments until directed
35. If you are in an informal study group, discussing basic concepts and ideas contained in the course materials and lectures is generally O.K. and encouraged; however, *you are not allowed to develop specific answers and/or program code with other students or people outside of the class*.

Finally, **you should check Canvas & Piazza frequently** (recommend every two days at a minimum) to remain aware of updates to assignments, policies and other course announcements and updates.

Acceptable Student Conduct Policies and Expectations:

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 Georgia Tech Student-Faculty Expectations Site articulates 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.

Services Offered through the Office of Disability Services:

Reasonable accommodations will be made for students with verifiable disabilities. If you are a student with learning needs that require special accommodation, please contact the Georgia Tech Office of Disability Services as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Also, please also e-mail your instructor as soon as possible to set up a time to discuss your learning needs.

Statement for not mentioned policies and issues: Any policies and issues not mentioned in this syllabus will follow policies and procedures according to the Georgia Institute of Technology: http://policylibrary.gatech.edu