CS 6400 DATABASE SYSTEMS CONCEPTS AND DESIGN

Creator, Instructor:
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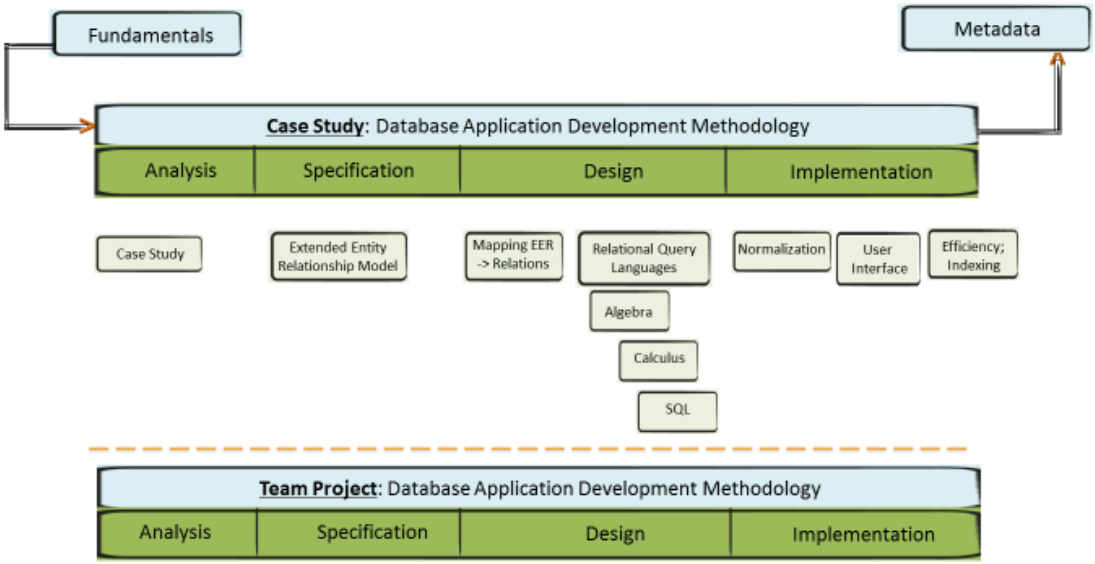
Several additional TAs: TBD

Office hours: Thursday 6-7pm EST (details TBD)

Overview:
I believe in learning-by-example and learning-by-doing.
This course presents an example of applying a database application development methodology to a major real-world project. All the database concepts, techniques and tools that are needed to develop a database application from scratch are introduced along the way when they are needed. In parallel - slightly delayed - learners in the course will apply the database application development methodology, the techniques and the tools to their own major class team project. In addition to the development methodology, techniques and tools learned in this course will include the Extended Entity Relationship Model, the Relational Model, Relational algebra, calculus and SQL, database normalization, efficiency and indexing. Finally, techniques and tools for metadata management and archival will be presented.



Prerequisites:

Learners should be familiar with at least one scripting or programming language, e.g. PHP, Python, Java. Some familiarity with software engineering concepts would be helpful. Flexibility to work remotely with team members.

Learning Outcomes:

At the end of this course the learner will:

- Understand and apply the concepts of data independence, database and database management system architecture, and the role and placement of a database management system the application stack
- Understand and apply the theoretical foundation of relational databases and query languages to create SQL data structure definitions and queries that meet identified requirements
- Create a relational database application, including the requirement analysis, specification, design and implementation of relational database applications
- Evaluate alternative internal schema structures and create indices for efficient database operation

Grading Summary:

2.5%	Initial Survey
50%	Four exams (12.5% each)
37.5%	Three project phases (12.5% each)
10%	Team assessment

Schedule: (Notice the use of AoE standard time. Please make sure you set your T-Square time zone to your own, so that there is no confusion about due dates/times.)

Aug. 22nd	First day of classes
Aug. 22 - Aug. 28th Midnight AoE	Initial Survey
Sept. 2nd	Project posted
Sept. 5th	Labor Day
Sept. 8th Midnight AoE – Sept. 11th Midnight AoE	Exam 1
Sept. 18th Midnight AoE	Phase I due
Oct. 6th Midnight AoE – Oct. 9th Midnight AoE	Exam 2
Oct. 10th – 11th	Fall break
Oct. 16th Midnight AoE	Phase II due
Nov. 10th Midnight AoE – Nov. 13th Midnight AoE	Exam 3
Nov. 20th Midnight AoE	Phase III due
Nov. 24th – 25th	Thanksgiving
TBD	Team Assessment
Nov. 28th – 30th	Demos
Dec. 8th Midnight AoE – Dec. 11th Midnight AoE	Exam 4

Exams, and Project:

Exams	Topic	Chapters	Videos
Exam 1	Intro, ER, EER	1, 2, 3, 4	Course overview; Fundamentals of DB; Extended Entity-Relationship Model
Exam 2	Relations, algebra, calculus, map ER, EER to relations	5, 8, 9	EER Relational Mapping; Relational Query Languages; Algebra, Calculus
Exam 3	SQL	6, 7	SQL
Exam 4	FDs, Normalization, file organization, indexing	14, 15.1, 15.2, 16, 17	Normalization, Efficiency; Indexing

Project	Deliverable. Details TBD. (watch GTOnline videos!!)	Chapters	Videos
Phase I	Analysis & Specification: ▪ IFD (10%) ▪ EER Diagram (40%) ▪ Data formatting (5%) (attributes, domains) ▪ Constraints (5%) ▪ Task Decomposition (10%) w/abstract code (30%)	1, 2, 3, 4	Methodology I: Analysis; Methodology II: Specification;
Phase II	Design: ▪ (revised) EER diagram ▪ EER to Relational mapping. (25%) ▪ SQL Create Table statements (25%) ▪ Task designs w/abstract code that refers to EER replaced w/SQL that refers the relations (50%)	5, 6, 7, 9	Methodology III: Design; Methodology III: Design [SQL]
Phase III	Implementation ▪ Inserts (10%), deletes (10%), updates (10%) ▪ Simple queries (20%)	10, 11, 14, 15.1, 15.2, 16, 17	Methodology IV: Implementation

	▪ Complex queries (40%) ▪ Brag feature (10%)		

You will receive all assignments and projects through T-Square, and each entry will show a due date. Please be sure to complete all assignments and projects by their due date. You will also receive grades and information on how much each graded item counts toward the overall grade for the course through T-Square.
We will be using Piazza as a forum. Please submit all of your course-related questions through Piazza. Please also make sure to read all Piazza postings, or you may miss important information about the course and the project.

Required text:
Elmasri & Navathe: Fundamentals of Database Systems. 7th Edition. Pearson 2016.
Additional course material will be available online.

Additional Resources:
WAMP installation guide, and more will be posted online.

Academic honesty:
All Georgia Tech students are expected to uphold the Georgia Tech Academic Honor Code.
Deep collaboration within project teams is encouraged. Collaboration between teams is not allowed in any way whatsoever.