CS 6400 DATABASE SYSTEMS CONCEPTS AND DESIGN
Spring 2017

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Instructor:
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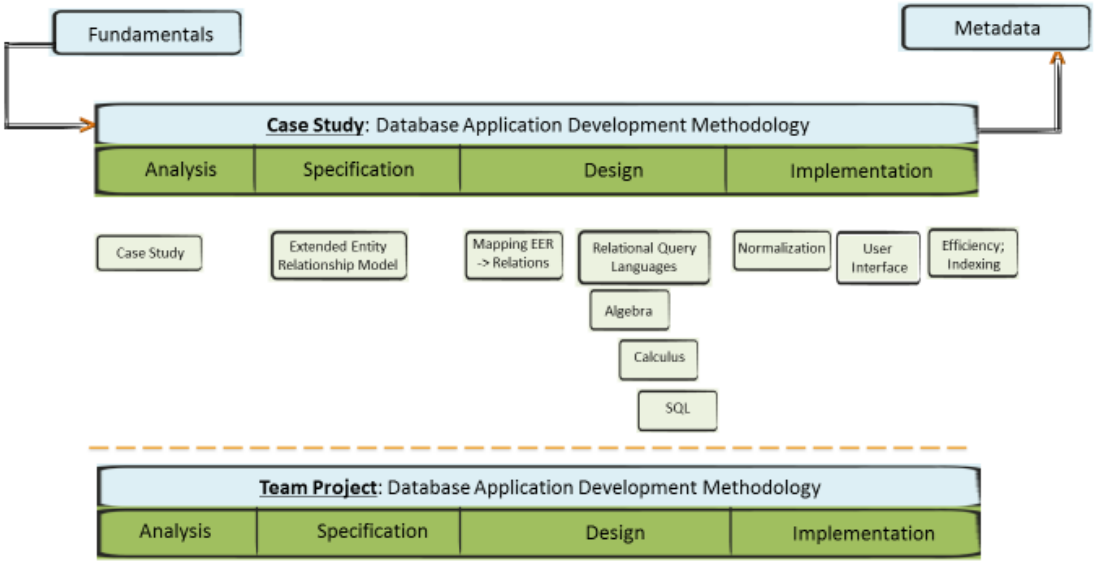
Several additional TAs: TBD

Office hours: Thursdays 8:30-9:30pm EST

Overview:

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 that supports connections to an SQL database backend. Some familiarity with software engineering concepts would be helpful. Learners must have the time and 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 Anywhere on Earth (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.)

Jan. 9th	First day of classes
Jan. 9th – Jan. 17th, Midnight AoE	Initial Survey
Jan. 16th	M.L.K. Jr. Day
Jan. 17th	Project Posted
On or before Jan 22nd	Teams Finalized
Jan. 26th – Jan 29th, Midnight AoE	Exam 1
Feb. 12th, Midnight AoE	Phase I due
Feb. 23rd - Feb 26th, Midnight AoE	Exam 2
Mar. 5th, Midnight AoE	Phase II due
Mar. 20th – March 26th	Spring Break!
Apr. 6th – Apr. 9th, Midnight AoE	Exam 3
Apr. 16th, Midnight AoE	Phase III due
Apr. 17th – Apr 23rd (scheduled slot)	Phase 3 Demos
Apr. 21st – Apr. 24th Midnight AoE	Team Assessment
Apr. 27th – Apr. 30th, Midnight AoE	Exam 4
Apr. 18th – May 6th	Course Instructor Opinion Survey (CIOS)

Exams, and Project:

Exams	Topics	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. (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%) ▪ Complex queries (40%) ▪ Brag feature (10%)	10, 11, 14, 15.1, 15.2, 16, 17	Methodology IV: Implementation

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 Q&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.