

EECS 341 Fall 2014

Introduction to Database Systems

Location: Nord Hall 410

Time: MW 3-4:15PM

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Office Hour: MW 2-3PM

Textbook: Database Management Systems, by Ramakrishnan and Gehrke, 3rd edition, McGraw Hill.

Prerequisite:

- Substantial experience with at least one programming language. EECS 233: Intro to Data Structures is a prerequisite to this course.
- Knowledge of basic data structures including trees, linked lists, arrays, priority queues, heaps. The course covers (somewhat) B+-trees.
- Basic knowledge of Hashing, Searching and Sorting. The course will use and refer to these topics without any overview--in the query processing part of the course.
- Knowledge of first-order logic (covered in EECS 302: Discrete math). This knowledge is needed for relational calculus coverage.
- Mathematical maturity with set theory, functions, notations, symbolisms, and algorithmic thinking.

Course Objectives:

- In-depth understanding of basic concepts in database systems including database modeling, query languages, storage structures and query optimization issues.
- In-depth knowledge of the Entity Relationship Model and the Relational Model, as well as steps in designing, populating and maintaining a database.

- In-depth knowledge of querying relational databases, and query languages, including relational algebra, relational calculus, and SQL (with aggregate functions).
- General knowledge of query processing and transaction management in databases.
- In-depth knowledge of logical database design, schema enhancement and normalization using data dependencies.
- Hands-on experience on building a database-enabled web-based application that involves:
 - Designing and querying a relational database,
 - Using a (commercial, usually MySQL or SQLServer) database management system effectively,
 - Project: Building a web-enabled application with a database backend. This part will involve significant code generation.
 - Building a basic user interface for the course project.
- Experience in
 - Report writing (project proposal and final project report are required),
 - Project design, demonstration and presentation,
 - Experience in working in a project team

Project DBMS: You can use any DBMS of your choice. SQLServer and MySQL are commonly used ones.

Grading:

- 4 Problem sets (worth 20%, please print and submit paper copy)
- Project (worth 15%)
- 2 Midterm Exams (worth 15% each)
- Final Exam (worth 30%)
- Participation (worth 5%)

Late Assignment and Project Policy: All homeworks are due at the beginning of the lecture of the due day. Late submissions are accepted until the midnight of the due day subject to 50% penalty.

Schedule (subject to change)

DATE	LECTURE NOTES	READING	HOMEWORK
Aug. 27	Introduction, The Entity-Relationship (ER) Model	Chapters 1, 2	
Sept. 1	Labor Day!		
Sept. 3	The Entity-Relationship (ER) Model		Homework1
Sept. 8	The Relational Model	Chapter 3	
Sept. 10	The Relational Model		
Sept. 15	The Relational Algebra	Chapter 4.1-4.2	
Sept. 17	The Relational Algebra		
Sept. 22	The Relational Calculus	Chapter 4.3-4.5	
Sept. 24	SQL: Queries, Constraints, Triggers (Part 1)	Chapter 5.1-5.4	Homework1 due Homework 2
Sept. 29	SQL: Queries, Constraints, Triggers (Part 2)	Chapter 5.5-5.10	
Oct. 1	Overview of Storage and Indexing	Chapter 8	
Oct. 6	Storing Data: Disks and Files	Chapter 9	
Oct. 8	Tree Structured Indexes	Chapter 10	
Oct. 13	Tree Structured Indexes, Midterm review		Homework2 due
Oct. 15	Midterm 1		
Oct. 20	Hash-based Indexes	Chapter 11	Homework 3 Project proposal requirements
Oct. 22	Overview of Query Evaluation, External Sorting	Chapters 12, 13	
Oct. 27	Fall break!		
Oct. 29	Evaluation of Relational Operations	Chapter 14	
Nov. 3	Schema Refinement and Normal Forms	Chapter 19	Homework #3 due Project proposal due Homework 4

Nov. 5	Schema Refinement and Normal Forms		
Nov. 10	Database Design and Tuning	Chapter 20	
Nov. 12	Overview of Transaction Management	Chapter 16	Homework 4 due
Nov. 17	Midterm 2		
Nov. 19	Concurrency Control	Chapter 17	
Nov. 24	Crash Recovery	Chapter 18	
Nov. 26	Project presentation		
Dec. 3	Project presentation		Project report due
Dec. 17 12:30PM-3:30PM	FINAL EXAM		