What is CS430 / CS430dl?

- Instructor and GTAs
- Homework assignments
- 4-5 Lab assignments
- Computer Systems / Labs
- Quizzes (on-line)
- 1 Midterm & Final
- Course Objectives
- Syllabus

Ch. 1 – Overview of Database Systems

- Purpose of Database Systems
- View of Data
- Database Languages
- Relational Databases
- Database Design
- Data Storage and Querying
- Transaction Management
- Database Architecture

Ch. 2 – Introduction to Relational Model

- Structure of Relational Databases
- Database Schema
- Keys
- Schema Diagrams
- Relational Query Languages
- Relational Operations

Ch. 3 – Introduction to SQL

- Overview of the SQL Query Language
- SQL Data Definition
- Basic Structure of SQL Queries
- Set Operations
- Null Values
- Aggregate Functions
- Nested Subqueries
- Modification of the Database

Ch. 4 – Intermediate SQL

- Join Expressions
- Views
- Transactions
- Integrity Constraints
- SQL Data Types and Schemas
- Authorization
Ch. 5 – Advanced SQL

- Accessing SQL From a Programming Language
- Functions and Procedures
- Triggers
- Recursive Queries
- Advanced Aggregation Features

Ch. 6 – Formal Relational Query Languages

- Relational algebra
- Projection
- Selection
- Set difference
- Cartesian Products
- Natural join

Ch. 7 – Database design and the ER model

- Overview of the Design Process
- The Entity–Relationship Model
- Constraints
- Removing Redundant Attributes in Entity Sets
- Entity–Relationship Diagrams
- Reduction to Relational Schemas
- Entity–Relationship Design Issues

Ch. 8 – Relational Database Design

- Features of Good Relational Designs
- Atomic Domains and First Normal Form
- Decomposition Using Functional Dependencies
- Functional–Dependency Theory
- Algorithms for Decomposition

Ch. 9 - Application Design

- JDBC interface

Ch. 10 - Storage and File Structure

- Overview of Physical Storage Media
- Magnetic Disk and Flash Storage
- RAID
- Tertiary Storage
- File Organization
- Organization of Records in Files
- Data–Dictionary Storage
- Database Buffer
Ch. 11 - Indexing and Hashing

- Basic Concepts
- Ordered Indices
- B+ – Tree Index Files
- B+ – Tree Extensions
- Multiple-Key Access
- Static Hashing
- Dynamic Hashing
- Comparison of Ordered Indexing and Hashing
- Bitmap Indices
- Index Definition in SQL

Ch. 12 – Query processing

- Overview
- Measures of Query Cost
- Selection Operation
- Sorting
- Join Operation
- Other Operations
- Evaluation of Expressions

Ch. 14 - Transaction Management

- Transaction Concepts
- A Simple Transaction Model
- Storage Structure
- Transaction Atomicity and Durability
- Transaction Isolation
- Serializability
- Transaction Isolation and Atomicity
- Transaction Isolation Levels
- Implementation of Isolation Levels
- Transactions as SQL Statements

Ch. 15 - Concurrency Control

- Lock-Based Protocols
- Deadlock Handling
- Multiple Granularity
- Timestamp-Based Protocols
- Validation-Based Protocols
- Multiversion Schemes 689 15.7
- Snapshot Isolation
- Insert Operations, Delete Operations, and Predicate Reads

Ch. 16 - Recovery

- To show what steps are taken in the ARIES method to recover from DBMS crashes
- To describe how logs are maintained and how they are used to recover from a crash
- To identify the concepts behind checkpoints and show how they are used.
- To show how recovery interacts with concurrency control

Computer Systems / Labs

- Assignments done using computer systems in C120 (Linux based, multi-core boxes)
- May use home equipment – but GTA will grade using the state capital boxes.
  - If it doesn’t run in that environment, it will be graded accordingly
  - Department policy
- Every student enrolled in a CS class is given an account in the CS environment
- Our MySQL server is faure.cs.colostate.edu
Homework / Programming Assignments

- Homework assignments every 1-2 weeks
- 4-5 lab assignments
  - Done using the state capital machines
  - SQL, design and build database
  - Java program using the JDBC interface
  - XML parser

Late Policy

- Assignments are due class time on Tuesdays (both homework and lab)
- Assignments have a 48 hour late period.
- Assignments turned in during the late period will be assessed a 20% late penalty
- All assignments will be submitted through Canvas
- Questions about grading should first be discussed with Dieudo.

Quizzes

- Weekly quizzes over the reading material
- 3 attempts
- Only highest attempt counts for grade
- Open book, open notes
- NOT open person

Exams

- Midterm exam during week 8
- Final exam during week 16
- On Campus – given in CS110
- On line – 72 hours
  - Friday, Saturday, Sunday
- Study guide will be published in advance

Syllabus

http://www.cs.colostate.edu/~cs430d

1/22/2019