

Course Code: COMP5311, Spring 2023

Course Title: Database Architecture and Implementation

Instructor: [Dimitris Papadias](#) (send e-mail for questions regarding the class and for arranging individual meetings)

Schedule: WedFri 3:00PM - 4:20PM, Rm 6573, Lift 29-30

Organization:

The course is divided in two parts: (i) background material taught by the instructor, (ii) specialized topics presented by students.

In addition to their presentation, students have to submit a survey on the topic by the end of the semester.

Tentative Grading Policy

50% final exam, 20% presentation, 20% survey, 10% class participation

The final exam will be with open books and notes and will cover all the material in the lecture slides and exercises (but not the student presentations).

Background material (by major topics):

- E/R Model
- Relational Model and Algebra
- SQL
- Functional Dependencies and Relational Database Design
- File Systems
- Tree and Hash Indexes
- Query Processing and Implementation of Relational Operators
- Query Optimization
- Transactions

Textbook

- [Database System Concepts](#), A. Silberschatz, H. Korth, and S. Sudarshan.

Reference

- [Database Management Systems](#), Raghu Ramakrishnan and Johannes Gehrke.

Exclusion

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Lecture Slides (After each lecture, the slides will be updated to include exercises solved during the lecture)

Introduction – ER diagrams ([Slides](#))

Relational Model - Algebra ([Slides](#))

SQL 1 ([Slides](#))

SQL 2 ([Slides](#))

SQL 3 ([Slides](#))

Topics in DB Research ([Slides](#))

Functional Dependencies ([Slides](#))

3NF and BCNF ([Slides](#))

File Structures and Indexing ([Slides](#))

B+-trees and Dynamic Hashing ([Slides](#))

Other Indexes, Selection Processing, External Sorting ([Slides](#))

Join Algorithms ([Slides](#))

Query Processing and Optimization ([Slides](#))

Transactions – 2PL ([Slides](#))

Timestamp-based Protocols ([Slides](#))

Review 1 (if time permits, last week of classes)

Review 2 (if time permits, last week of classes)

