



CS 306 Database Systems

2021-2022 Fall Syllabus



GENERAL INFORMATION

- Office : FENS 2081
- Email : ysaygin@sabanciuniv.edu
- Tel : 9576
- Web : <http://people.sabanciuniv.edu/~ysaygin/>
- Office Hours : will be announce later
- Use sucourse for discussions regarding the course.
(Your TAs will check the messages regularly and inform me for any urgent matter)

GENERAL INFORMATION : Text Book





Grading Policy

- There will be 2 Midterms and a Final :
 - MT1 -25% (exact day and time TBA)
 - MT2 - 25% (exact day and time TBA)
 - FINAL - 30% (exact day and time TBA)
 - HW Assignments - 10% (There will be around 5 HWs)
- DB Application Project: 10%
 - Group project (max 5 students).
 - Choose different projects, or variations.
 - You may use the MySQL or any other Database Management System to develop your database application.



Makeup Policy

- Final may be a makeup for one of MT1 or MT2



Learning objectives

- Learning how to **design and implement** a database application
 - Conceptual design
 - Relational Model
 - Mapping ER to Relational Model
 - Schema refinement and normal forms
 - Querying
- Learning **database system** concepts
 - Concurrency Control and Transaction Management
 - Recovery
 - Storage and Indexing
- Learning new generation data storage and querying (**and also understanding that the conventional SQL databases are not obsolete**)



List of Topics

(Order of teaching may be slightly different)

- Introduction to Database Systems
- Entity Relationship Model
- Relational Model
- Relational Algebra
- SQL Queries



List of Topics (Contd.)

- Functional Dependencies
- Normal Forms
- Schema Decomposition into Normal Forms



List of Topics (Contd.)

- Data Storage and Indexing
- Transaction Management
- Concurrency Control
- Crash Recovery



List of Topics (Contd.)

- NoSQL Databases and Key-Value Stores
- Graph Database Model

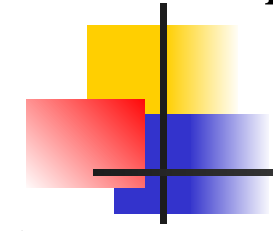
FINAL will cover all the topics including NoQL and Graph Database Model



PROJECT

- Form your group (Max 4 people)
- Think about a real-life database application project
- Step 1: Write a one page report describing what you want to do for this project. Write your report using any editor and submit the PDF through sucourse
- Report should list the group members but **only one student should submit the report.**
- If you submit you will get 0
- Otherwise you will get -1

An example database application



(Taken from the book “Fundamentals of Database Systems” by Elmasri and Navathe)

Company database keeps track of a company’s employees, departments and projects.

1. The company is organized into departments. Each department has a unique name, a unique number and a particular employee who manages the department. We keep track of the start date when that employee began managing the department. A department may have several locations.
2. A department controls a number of projects, each of which has a unique name, a unique number and a single location.
3. We store each employee’s name, Social Security number, address, salary, sex and birth date. An employee is assigned to one department but may work on several projects, which are not necessarily controlled by the same department. We keep track of the number of hours per week that an employee works on each project. We also keep track of the direct supervisor of each employee.
4. We want to keep track of the dependents of each employee for insurance purposes. We keep each dependent’s first name, sex, birth date and relationship to the employee.



Learning objectives

- Learning how to **design and implement** a database application
 - Conceptual design (ER model)
 - Relational Model
 - Mapping ER to Relational Model
 - Schema refinement and normal forms
 - Querying (SQL)
- Learning **database system** concepts
 - Concurrency Control and Transaction Management
 - Recovery
 - Storage and Indexing



What you need to do:

- Attend the lectures if you want to interact with me
- Ask any question you like during the lectures (or during my office hours)
- Don't be scared to ask questions or contribute with your comments
- Work harmoniously for the group project
- Pass this course with a good grade!
 - You need to collect min 50 out of 100 points
 - Please take advantage of the midterms, final is a bit harder.