



# CS 226 Fundamental Databases

Summer 2024

**Course Credits:** 4

**Contact Hours:** 56 hours

**Instructor:** TBA

**Email:** TBA

## COURSE OBJECTIVES

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This course provides an in-depth exploration of the fundamentals of database systems. Students will learn various data models, query languages, database architecture, and designing and implementing a database application in a collaborative setting. Topics covered include entity-relationship modeling, relational algebra, SQL, physical database architecture, normalization, and more.

Upon Completion of this Course, students will be able to:

1. Understand fundamental concepts of database systems..
2. Demonstrate proficiency in applying entity-relationship modeling.
3. Demonstrate proficiency in working with relational databases..
4. Utilize relational algebra and relational calculus for querying databases..
5. Construct and execute database operations using SQL.
6. Implement embedded SQL and comprehend functional dependencies and normalization.
7. Master the process of physical database design.

## PREREQUISITES

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CS 112 Introduction to Databases II

## GRADING

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Grades will be determined by accumulating points, with 100 points being the maximum, as follows:



ITEM	POINTS
Quizzes	15 Points
Assignments	20 Points
Midterm	15 Points
Project	20 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F$ .

We reserve the right to make adjustments to the overall grading policy.

## COURSE MATERIALS

### Required Texts:

Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom. *Database Systems: The Complete Book*, 2nd edition, Pearson

### Recommended (Optional) Texts or Other Materials:

None

## COURSE TOPICS

MODULE	TASKS
Module 1	<b>Topics:</b> Topic 1: Outline of Database-System Studies. Topic 2: Basics of the Relational Model. Topic 3: Defining a Relation Schema in SQL. Topic 4: An Algebraic Query Language. <b>Assessments:</b> Quiz#1 Assignment#1
Module 2	<b>Topics:</b> Topic 5: Design Theory for Relational Databases. Topic 6: The Entity/Relationship Model. Topic 7: From UML Diagrams to Relations. Topic 8: From ODL Designs to Relational Designs.



	<b>Assessments:</b> Quiz#2 Assignment#2
Module 3	<b>Topics:</b> Topic 9: Algebraic and Logical Query Languages. Topic 10: Simple Queries in SQL. Topic 11: Constraints and Triggers. Topic 12: Views and Indexes. <b>Assessments:</b> Midterm Project
Module 4	<b>Topics:</b> Topic 13: SQL in a Server Environment. Topic 14: Security and User Authorization in SQL. Topic 15: The Semistructured-Data Model. Topic 16: Programming Languages for XML. <b>Assessments:</b> Quiz#3 Project due
Module 5	<b>Topics:</b> Topic 17: Introduction to Physical-Query-Plan Operators. Topic 18: Query Compiler. Topic 19: Concurrency Control. Topic 20: Parallel and Distributed Databases. <b>Assessments:</b> Final Exam

## ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed



the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

## **LEARNING REQUIREMENTS**

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

## **TECHNOLOGY POLICY**

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

## **ACADEMIC INTEGRITY POLICY**

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

## **DISABILITY ACCOMMODATION**

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for



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access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.