SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

Introduction to Database Management Systems

CS 157A

Fall 2025 Sections 03, 04 In Person 3 Unit(s) 08/20/2025 to 12/08/2025 Modified 08/11/2025

Contact Information

Instructor	Dr. Tahereh Arabghalizi (She, Her)
Office	DH 239
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Office Hours	Tuesdays and Thursdays 4:30-5:30pm (Zoom by appointment (https://calendly.com/tahereh-arabghalizi-sjsu-fall23)) - Send me an **email** in advance if you need to meet me in person.
Teaching Assistant	Sai Wong <sai.wong@sjsu.edu.>

Course Description and Requisites

Relational data model. Relational algebra. Standard SQL. Design theory. Conceptual data modeling. Integrity constraints and triggers. Views and indexes. Transactions. Distributed data management. Interactive and programmatic interfaces to database systems. Application programming project using a prominent database system.

Prerequisite(s): CS 146 (with a grade of "C-" or better); Computer Science, Applied and Computational Math, Forensic Science: Digital Evidence, Software Engineering, or Data Science majors only; or instructor consent.

Letter Graded

Classroom Protocols

Students are expected to adhere to the Student Conduct Code found at the SJSU Student Conduct website (http://www.sjsu.edu/studentconduct/) (http://www.sjsu.edu/studentconduct/). Additionally, students should regularly attend lectures and labs (if applicable), treat instructors and peers with respect, and

refrain from the use of cell phones during any classroom activities.

- Regular class attendance is highly recommended and strongly encouraged.
- Please arrive to class on time so that you benefit fully from the course experience and you do not disturb classmates and the instructor while class is in session.
- Students are responsible for knowing all materials covered in class lectures, readings, assignments, and other course-related work.
- Laptops, tablets, and other devices should only be used for course-related purposes.
- Please turn off your headphones before the class starts.
- All exams must be taken in-person except for extreme emergencies.

Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

Course Goals

- To ensure the understanding of the fundamentals of relational database systems, including data models, database design, and database manipulations
- To teach how to express relational logic using relational algebra
- To teach the data definition, manipulation, and querying aspects of SQL (Structured Query Language)
- To introduce constraints and triggers as an integrity control mechanism in database systems.
- To introduce the concept of database transactions and their ACID properties (Atomicity, Consistency, Isolation and Durability)
- To teach students how to interact with a DB system from a programming language such as Java

Course Learning Outcomes (CLOs)

Upon successful completion of this course, students should be able to:

- Explain basic database concepts, including the structure and operations of the relational data model
- Identify key components of database management systems and their functions at a high level
- Identify functional dependencies and apply normalization algorithms
- Use SQL as a Data Definition Language (DDL) to create and alter databases, tables, views and indexes
- Use SQL as a Data Manipulation Language (DML) for querying and modifying databases
- Define and use constraints and triggers in SQL Describe the concept of transactions
- Build a simple database application in a high-level programming language (e.g., Java) that interacts with a relational database system at the back-end (e.g., MySQL, SQL Server)

Course Materials

Database Systems: The Complete Book (2nd edition) by Garcia-Molina, Ullman, and Widom Textbook web site: http://infolab.stanford.edu/~ullman/dscb.html (http://infolab.stanford.edu/~ullman/dscb.html)

Course Requirements and Assignments

- **In-class pop-up questions/polls and discussion** may be given anytime. The purpose of in class exercises and pop questions is to encourage you to learn, study and review the concepts and materials presented/discussed in the lecture.
- **ZyBooks Homework and Hands-on Assignments**: assignments are to be done individually, unless otherwise specified. They can be discussed but should be done individually. More information is given at the time of the first assignment.
- **Final Project**: Students should form a team with 2 or 3 members. More details will be provided during the semester.
- **Midterm Exam**: there will be one exam (midterm) during the semester.
- **Final Exam**: The final exam could be comprehensive or non-comprehensive (TBD). Date (https://www.sjsu.edu/classes/final-exam-schedule/fall-2025.php)

Course Policies

Incomplete Work: Points will be deducted for incomplete question responses and solutions that are partially functional. Consult individual assignments for details of point allocation for each problem.

Late Assignments: No late homework will be accepted. However, under exceptional circumstances, one problem set per student might be accepted late. It will need to be handed in before the following class meeting and will be graded with 30% off. Such an extension should be requested from the instructor.

Makeup Exams: Makeup exams will only be given in cases of illness (documented by a doctor) or in cases of documentable, extreme emergencies.

Academic Honesty: Students must only submit their own work for all quizzes, assignments, exams, and projects. Copying and any other form of cheating will not be tolerated and will result in a failing grade (F) for the course, as well as disciplinary consequences from the university.

Grading Information

Course weightings will be as follows:

- 25% Assignments including Zybooks Homework & Hands-on
- 25% Final Group Project
- 25% Midterm Exam
- 25% Final Exam
- Extra 5% Class Activity including Attendance, Polls & Surveys

Your course grade will be determined by your final weighted average:

- *A plus = 97% or higher*

- *A = 93% up to 97%*
- *A minus = 90% to 93%*
- *B plus = 87% to 90%*
- *B = 83% to 87%*
- *B minus = 80% to 83%*
- *C plus = 77% to 80%*
- *C = 73% to 77%*
- *C minus = 70% to 73%*
- *D plus = 67% to 70%*
- *D = 63% to 67%*
- *D minus = 60% to 63%*
- *F = 0% to 60%*
- Boundary cases count as the higher of the two grades.

All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades. See University Policy S20-2 for more details.

University Policies

Per University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

The course schedule is subject to change with fair notice. Changes will be announced on Canvas.

Week	Topics
1	Course Introduction, Prerequisites Check
1	Introduction to Database
2	Relational Algebra
2	Relational Database Design

Week	Topics
3	Schema Design Normalization
3	Schema Design Normalization
4	Logical Database Model
4	Logical Database Model
5	SQL Programming
5	SQL Programming
6	SQL Programming
6	SQL Programming
7	SQL Programming
7	SQL Programming
8	SQL Programming
8	Midterm (TBD)
9	SQL Programming
9	SQL Programming
10	JDBC
10	JDBC
11	JDBC

Week	Topics
11	NoSQL
12	NoSQL
12	Graph Databases
13	Final Project Discussion
13	Final Project Discussion
14	Final Project Discussion
14	TBD
15	TBD
Final Exam	Check Date and Time Here (https://www.sjsu.edu/classes/final-exam-schedule/fall-2025.php)