

San José State University
Department of Computer Science
Fall 2026
CS 257 – Database Systems Principles

Course and Contact Information

Instructor: Ramin Moazeni, PhD
Class Hours: TTh: 7:30PM - 8:45PM
Office Hours: Fri: 1:30PM – 2:00PM over Zoom or after class
Email: Ramin.Moazeni@sjsu.edu
Classroom: MH 422

Prerequisites: CS 157B or instructor consent

Catalog Description

Design management and performance issues on file organization and access methods, buffer management and storage management. Query processing and query optimization, transaction management, recovery, and concurrency control techniques. Reliability, protection and integrity techniques. Extensive programming project.

This course covers the essential concepts, principles, techniques, internals and mechanisms for the design, analysis, use, and implementation of computerized database systems.

The database and information management system technology examined in this course represents the state-of-the-art, including traditional approaches as well as recent research developments. By providing a balanced view of "theory" and "practice," the course should allow the student to understand, use, and build practical database and information management systems.

Learning Outcomes

By the end of this course, a student should be able to:

- Understanding of Storage management architecture and relevant performance issues
- Understanding of File and System structure, page structure, heap files, buffer manager
- Detailed understanding of DBMS critical subsystems such as query processing and optimization techniques,
- Understanding of concurrency control, transaction management and recovery.
- Detailed understanding to the different indexes support (Static Hashing, Extendible Hashing, Linear Hashing) and how they are leveraged by the query optimizer.
- Exposure to current advanced research topics related to Big Data paradigm for distributed processing.

Required Texts

(Required) Raghu Ramakrishnan, Johannes Gehrke
Database Management Systems
3rd Edition
ISBN-13: 978-0072465631
ISBN-10: 0072465638

(Recommended) Garcia-Molina, Ullman, Widom
Database Systems: The Complete Book
2nd Edition
ISBN-13: 978-0131873254
ISBN-10: 0131873253

Course Requirements and Assignments

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at <http://www.sjsu.edu/senate/docs/S12-3.pdf>. Note that University policy F15-12 at

<http://www.sjsu.edu/senate/docs/F15-12.pdf> states that “Attendance shall not be used as a criterion for grading.”...

“Students are expected to attend all meetings for the courses in which they are enrolled as they are responsible for material discussed therein, and active participation is frequently essential to ensure maximum benefit to all class members. In some cases, attendance is fundamental to course objectives; for example, students may be required to interact with others in the class. Attendance is the responsibility of the student.”... “Participation may be used as a criterion for grading when the parameters and their evaluation are clearly defined in the course syllabus and the percentage of the overall grade is stated.”

Assignments

Assignment specification and their corresponding due dates will be posted on Canvas.

The submissions are due at midnight on the due date. The assignments are to be submitted on time. A penalty of 10% per day is applied to late submissions. No assignments will be accepted after a week past its due date.

Course Project:

A programming group project of your choice related to the course. Detailed guidelines including milestones for the project will be posted on Canvas in the second week of the semester.

Absolutely NO late submission for the course project.

Exams

- Absolutely NO items may be shared during the exams, including books, notes, and calculators.
- Absolutely NO usage of cell phones during exams. Cell Phones must in off or silent mode and not within your reach.

Makeup exams will only be granted in case of documented medical emergency with an advanced notice to the instructor.

No students are allowed to miss either exam. Failure to take an exam during its scheduled time will result in a grade of zero on that exam.

Grading Policy

Your individual class grade will be weighted as follows:

Assignments	20%
Course Project	20%
Exams (Midterm and Final)	60% (each exam 30%)
Total	100%

The final "letter" grade will be determined by a curve based on class average at the end of the semester.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

CS 257, Database Systems Principles, Course Schedule

Course Schedule (Tentative)

Week	Date	Lecture Topic	Readings / Materials	Assignments / Exams
1	Thu 8/20/2026	Course Introduction		
2	Tue 8/25/2026	Relational Algebra	[RG] Chapter 4	
	Thu 8/27/2026	Storage and RAID Systems	[RG] Chapter 9	HW1 Due
3	Tue 9/1/2026	File and System Structure	[RG] Chapter 9	
	Thu 9/3/2026	File and System Structure	[RG] Chapter 9	
4	Tue 9/8/2026	Indexing and Hashing	[RG] Chapters 8, 10	HW2 Due
	Thu 9/10/2026	Indexing and Hashing	[RG] Chapters 8, 10	
5	Tue 9/15/2026	Indexing and Hashing	[RG] Chapters 8, 10	
	Thu 9/17/2026	Query Processing — Introduction	[RG] Chapter 12	Partner Selection Due
6	Tue 9/22/2026	Query Processing	[RG] Chapter 14	
	Thu 9/24/2026	Query Processing	[RG] Chapter 14	HW3 & Project Proposal Due
7	Tue 9/29/2026	Query Optimization	[RG] Chapter 15	
	Thu 10/1/2026	Query Optimization	[RG] Chapter 15	
8	Tue 10/6/2026	Query Optimization	[RG] Chapter 15	
	Thu 10/8/2026	Midterm Review		
9	Tue 10/13/2026	Midterm Review / Selected Topics		
	Thu 10/15/2026	Midterm Exam		Midterm Exam
10	Tue 10/20/2026	External Sorting	[RG] Chapter 13	
	Thu 10/22/2026	External Sorting	[RG] Chapter 13	
11	Tue 10/27/2026	Transactions	[RG] Chapter 16	
	Thu 10/29/2026	Transactions	[RG] Chapter 16	HW4 Due
12	Tue 11/3/2026	Concurrency Control	[RG] Chapter 17	
	Thu 11/5/2026	Concurrency Control	[RG] Chapter 17	Milestone 1 — Status Report Due
13	Tue 11/10/2026	Database Design	[RG] Chapter 19	
	Thu 11/12/2026	Crash Recovery	[RG] Chapter 18	
14	Tue 11/17/2026	Crash Recovery	[RG] Chapter 18	
	Thu 11/19/2026	Database Security	[RG] Chapter 21	HW5 Due
15	Tue 11/24/2026	Distributed Databases	[RG] Chapter 22	
	Thu 11/26/2026	Thanksgiving Holiday — No Class		
16	Tue 12/1/2026	Distributed Databases / Project Presentations	[RG] Chapter 22	
	Thu 12/3/2026	Project Presentations / Final Review		Code Submission & Presentation/Demo Due
	Fri 12/4/2026			Final Report Due
	Mon 12/7/2026			HW6 Due
Final	Thu 12/10/2026	Final Exam — 7:45–9:45 PM		Final Exam