
Database Management Systems IICS 157B

- Fall 2026
- Section 01
- In Person
- 3 Unit(s)
- 08/19/2026 to 12/07/2026
- Modified 07/26/2026

Contact Information

Instructor: Frank Luo

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TA:

Office Hours: MW 2:45-3:45pm in DH282

Class Meets:Sec1 MW 1:30-2:45pm in MH225

Course Description and Requisites

Survey course. Object-oriented data model, definition language, query language. Object relational database systems. Database trends like active, temporal, multimedia, deductive databases. Web database topics, namely, architectures, introduction to interface languages. Team projects.

Prerequisite: CS 157A (with a grade of "C-" or better); Computer Science, Applied and Computational Math, Forensic Science: Digital Evidence, or Software Engineering Majors only; or instructor consent.

Letter Graded

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 Learning Outcomes (CLOs)

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

1. **Explain** the principles of physical database storage, indexing structures, and file organization, and evaluate their impact on database performance.
2. **Analyze** query execution plans and apply query optimization techniques to improve the efficiency of relational database systems.
3. **Evaluate** transaction processing and concurrency control mechanisms, including serializability, locking protocols, timestamp ordering, and multiversion concurrency control.
4. **Design** database recovery strategies using logging, checkpointing, and crash recovery techniques to ensure data integrity and system reliability.
5. **Compare and analyze** distributed database architectures, replication strategies, fragmentation methods, and distributed transaction protocols.
6. **Design** data warehouse schemas and apply OLAP concepts to support analytical decision-making.
7. **Apply** advanced database concepts by designing, implementing, and presenting a database-related project that addresses a real-world problem.

Course Requirements and Assignments

Text Book:	Database Systems: The Complete Book. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom
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Grading Information

Assessment & Grading

Component	Description	Weight
In-Class Tickets & Exercises	best scores, lowest two tickets dropped	20%
Homework	homeworks	20%
Midterm 1 Exam	Week 7	20%
Midterm 2 Exam	Week 15	20%
Project	Final Week	20%

Grading Scale

Grade	Percentage
A+	97–100%
A	93–96%
A-	90–92%
B+	87–89%
B	83–86%
B-	80–82%
C+	77–79%
C	73–76%
C-	70–72%
D+	67–69%
D	63–66%
D-	60–62%
F	Below 60%

University Policies

Per [University Policy 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](#) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

Week	Day	Date	Topics
W1	W	August 19	Syllabus, Course Overview, Review of Relational Databases, Advanced Database Architecture, Final Project Introduction
W2	M	August 24	Storage Management: Disk Storage, File Organization, Buffer Management
	W	August 26	Storage Management II: Disk Storage, File Organization, Buffer Management
W3	M	August 31	Index Structures I: B+-Tree Mechanics (Insert, Delete, Node Splitting/Merging)
	W	September 2	Index Structures II: Hash Indexes, Clustered vs. Nonclustered Indexes, Index Selection
W4	M	September 7	Labor Day – No Class
	W	September 9	Query : Logical & Physical Query Plans
W5	M	September 14	Query Optimization: Cost Estimation, Statistics, Histograms
	W	September 16	Query: Execution Plans
W6	M	September 21	Query execution. System failure
	W	September 23	System failure , log, redo/undo
W7	M	September 28	Midterm I Review & Final Project Phase 1 Discussion
	W	September 30	Midterm I (Storage, Indexing, Query Processing & Optimization)
W8	M	October 5	Transaction Processing: ACID Properties, Transaction Schedules

Week	Day	Date	Topics
	W	October 7	Serializability: Conflict & View Serializability, Precedence Graphs
W9	M	October 12	Concurrency Control I: Two-Phase Locking (2PL), Lock Compatibility, Strict 2PL
	W	October 14	Concurrency Control II: MVCC
W10	M	October 19	Parallel
	W	October 21	Distributed Databases: Architecture, Fragmentation, Replication
W11	M	October 26	Distributed Databases: Architecture, Fragmentation, Replication
	W	October 28	Distributed Databases: Architecture, Fragmentation, Replication
W12	M	November 2	Data Warehousing: ETL Processes, Multi-Dimensional Modeling, Star vs. Snowflake Schemas
	W	November 4	Information Integration: Enterprise Data Integration, Wrappers, Mediators, and Schema Mapping
W13	M	November 9	Data Warehousing: ETL Processes, Multi-Dimensional Modeling, Star vs. Snowflake Schemas
	W	November 11	Veteran's Day – Campus Closed (No Class)
W14	M	November 16	Data Mining I (Items Occurring Together): The Market-Basket Model, Frequent Itemsets, Apriori and PCY Algorithms
	W	November 18	Data Mining I (Items Occurring Together): The Market-Basket Model, Frequent Itemsets, Apriori and PCY Algorithms
W15	M	November 23	Data Mining II (Similarity of Documents): Text Processing, \$k\$-shingling, Jaccard Similarity, Minhashing & Locality-Sensitive Hashing (LSH)
	W	November 25	Midterm II (Transactions, Recovery, Distributed DBs, Warehousing, Integration, Data Mining)

Week	Day	Date	Topics
W16	M	November 30	Final Project Showcase / Interactive Consultation & Wrap-Up
	W	December 2	Final Project Presentations (Group A)
Finals	M	December 7	Final Project Presentations (Group B), Course Wrap-Up