San José State University
College of Engineering/Computer Engineering Department
CMPE 138/180B, Database Systems, Spring 2025

Course and Contact Information

Instructor:	Gheorghi Guzun
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Office Hours:	Tuesday/Thursday 11:00 a.m. — 12 :00 p.m.
Class Days/Time:	Tuesday/Thursday 9:00 a.m.— 10 :15 a.m.
Classroom:	ENG Building 337
CMPE 138 Prerequisites:	Receive a C- or better grade in CMPE 126 , or Instructor Consent *"Students who do not provide documentation of having satisfied the class prerequisite and co-requisite requirements (if any) by the second class meeting will be dropped from the class."*
CMPE 180B Prerequisites:	Admission into MS Artificial Intelligence, MS Computer Engineering or MS Software Engineering. Not available to Open University students. Students who do not provide documentation of having satisfied the prerequisite requirements by the second class meeting will be dropped from the class.
TA:	**Ravi Teja Gattu** **email:** raviteja.gattu@sjsu.edu

Course Format

This course requires the student to have a personal computer that is installed with a modern operating system. The lectures will be delivered in the classroom, however the students might be asked to use their laptops or smart devices during the class, or offline in order to participate in the class assignments.

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on my faculty web page at http://www.sjsu.edu/people/firstname.lastname and/or on Canvas Learning Management System course login website at http://sjsu.instructure.com. You are responsible for regularly checking with the

messaging system through MySJSU on Spartan App Portal http://one.sjsu.edu (or other communication system as indicated by the instructor) to learn of any updates.

Course Description

File organization and storage structure, database system architecture, entity relationship model, normalization techniques, SQL, relational algebra, storage organization, query processing, and concurrency control.

Course Goals and Learning Objectives

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

1. To learn what is a database system and architecture of it
2. To learn data independence and schemas
3. To learn how to draw an Entity Relationship Diagram from problem specifications
4. To learn how to convert ER into relations
5. To learn fundamentals of relational algebra
6. To learn how identify functional dependencies and normalize relations
7. To learn how to write database queries in Structured Query Language
8. To learn what is concurrency control and why it is important.
9. To learn basic techniques for creating serial schedule in concurrency control
10. To learn how to provide recovery in a database system

Course Learning Outcomes (CLO)

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

CLO 1 Have an ability to apply knowledge of writing relational algebra and SQL.
CLO 2 Have an ability to design a database and apply normalization steps.
CLO 3 Have an ability to identify, formulate and solve problems by drawing an Entity Relationship Diagram from problem specifications and writing SQLs that utilize databases.
CLO 4 Have an ability to use the techniques and skills of using a modern relational database.

Required Texts/Readings

Textbook

- Ramez Elmasri and Shamkant Navathe, *Fundamentals of Database Systems, 7/E*. Pearson, 2015, ISBN:9780133970777. eBook ISBN: 9780133971224, 9780133971330, 9780137502523.✦https://www.pearson.com/us/higher-education/program/Elmasri-Fundamentals-of-Database-Systems-7th-Edition/PGM189052.html
- https://www.vitalsource.com/products/fundamentals-of-database-systems-ramez-elmasri-shamkant-b-v9780133971224

Note: 6/E can be used though chapter orders are different.

Reference Books

- Garcia-Molina, Hector, Jeffrey D. Ullman, and Jennifer Widom. "Database Systems: The Complete Book." (2008).

Other Readings

Hand-outs will be distributed in the class if needed.

Other requirements

Programming skills like C/C++, Java and Python are required.

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 .

- **Homework assignments:** Exercises and programming assignments will be assigned after learning several topics. The homework is a tool for you to learn the material and prepare you for the exams. **On time submissions will receive a 5% bonus. Late submissions will be accepted up to 2 days after the due date, with no bonus.** Beyond that late submissions will not be accepted (unless there is a documented medical excuse).
- **Reading assignments:** You should read the appropriate chapters in the textbook before the next class.
- **Quizzes**: Unannounced quizzes may be given during class, taking less than 15 minute in total. The quizzes will be based on material from the previous lectures. Reading quizzes could be assigned before lectures as well. Some quizzes may require a laptop, thus students are expected to come in class with their own laptop.
- **Programming assignments:** Some programming tasks will be assigned. Programming assignments are done individually, unless otherwise specified. They can be discussed together, but **should be implemented individually.**
- **In class activities:** You are encouraged to collaborate with your colleagues on in-class activities.
- **Exams**: 1 midterm exam (closed books, one letter size page of handwritten notes allowed) will be taken during the semester.
- **Final exam:** The final exam, closed books and comprehensive, will be worth 30% of your grade. The exams will contain multiple choices questions, short answer questions and questions that require code or pseudocode and/or computations. (closed books, one letter size page of handwritten notes allowed).
- Major exams in this class may be video recorded to ensure academic integrity. The recordings will only be viewed if there is an issue to be addressed. Under no circumstances will the recordings be publicly released.

No late assignments will be accepted. Email submission of assignments will NOT be accepted. Please turn in all assignments in the class except for programming assignment. An extension or an exception will be granted only if a student has serious and compelling reasons that can be proven by an independent authority (e.g. doctor's note if the student has been sick).

Grading Information

15% Course project
20% Homeworks
5% In class activities
10% Quizzes/In-class assignments
20% Midterm
30% Final Exam

To pass this course, you must submit all the assignments and attend exams. The final letter grade will be determined by the following score ranges (depending on the overall class performance the range distribution may change at the end of the semester):

A+	98-100
A	93-97.99
A-	90-93.99
B+	87-89.99
B	83-86.99
B-	80-82.99
C	65-79.99
D	55-64.99
F	0-54.99

Classroom Protocol

Each student is required to engage in classroom activities with active participation, submit assignments and reports on time, and take exams and tests on time.

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 at http://www.sjsu.edu/gup/syllabusinfo/"

Course Schedule

The schedule is subject to change with fair notice through the email or the course website.

WK	TOPIC	BOOK CHAPTERS	Assignments due
1	Course logistics and Introduction to Data Models and Database Management Systems	**1,2**	
	SQL: *Concepts: Schemas, Systems, Select-From-Where*	**5**	
4	**SQL:** *Concepts: Schemas, Systems, Select-From-Where*	**5**	
5	**SQL:** *Concepts: Joins, Set operators, Subqueries*	**6**	
6	**Advanced SQL:** *Concepts: Grouping, Aggregations, Nested queries*	**7,8**	Homework 1
7	**Scale**: Indexing and IO Model	**16**	
8	Sorting, Building Indices	**17**	Homework 2
9	Tree Indexes, Query Optimization	**17,18**	
10	Query Optimization ... Continued	**18,19**	Homework 3
11	Midterm review, **Midterm**		
12	System Design		
13	Transaction Processing	**20**	
14	Transaction Processing	**20,21**	Homework 4
15	E/R Model and Design	**3**	
16	Design/Project Presentations	**3**	Project Report
17	Project presentation		Project Presentation
18	**Final Exam**		