

San José State University
College of Engineering/Computer Engineering Department
CMPE 226 - Database Design, Section 1, Spring 2020

Course and Contact Information

Instructor:	Dr. Kong Li
Office Location:	ENG 250
Email:	kong.li@sjsu.edu (Email subject starts with CMPE226)
Office Hours:	Mon 4:30PM – 5:30PM or by appointment
Class Days/Time:	Mon & Wed 1:30PM – 2:45PM (1/23/2020 - 5/11/2020)
Classroom:	Boccardo Business Center 205
Prerequisites:	CMPE 272 or instructor consent. Computer Engineering or Software Engineering majors only. Students who do not provide documentation of having satisfied the class prerequisite requirements by the second class meeting will be dropped from the class.

Course Description

Database architectures, technologies, and practices for enterprise systems that use structured, semi-structured, and unstructured data. Provides opportunities to research and acquire experience using modern and emerging concepts in relational and non-relational database theory and technologies. Prerequisite: CMPE 272 or instructor consent. Computer Engineering or Software Engineering majors only.

Catalog Course Description is available at <http://info.sjsu.edu/web-dbgen/catalog/courses/CMPE226.html>

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on [Canvas Learning Management System course login website](https://sjsu.instructure.com) at <https://sjsu.instructure.com>. Each submission of any assignment (homework, report, etc.) is “**self-contained**” and should be made on Canvas. You are responsible for regularly (i.e. every couple of days) checking with the messaging system (email, announcements, discussions) through Canvas and through MySJSU on [Spartan App Portal](http://one.sjsu.edu) at <http://one.sjsu.edu> to learn of any updates. Students are encouraged to use the Canvas discussion boards for collaboration.

- [Canvas information](http://www.sjsu.edu/ecampus/teaching-tools/canvas/index.html) at <http://www.sjsu.edu/ecampus/teaching-tools/canvas/index.html>
- [Canvas student resources](http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources/index.html) at http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources/index.html
- If you are having problems logging on, please [submit a ticket](https://isupport.sjsu.edu) at <https://isupport.sjsu.edu>
- [View instructor's comment](https://guides.instructure.com/m/4212/1/54359-how-do-i-view-instructor-comments) at <https://guides.instructure.com/m/4212/1/54359-how-do-i-view-instructor-comments>, and [view annotated comment](https://guides.instructure.com/m/4212/1/352349-how-do-i-view-annotation-feedback-comments-from-my-instructor-directly-in-my-assignment-submission) at <https://guides.instructure.com/m/4212/1/352349-how-do-i-view-annotation-feedback-comments-from-my-instructor-directly-in-my-assignment-submission>

Course Goals

1. To learn what is a database system management system and architecture of it

2. To learn what is entity/relationship model
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 how identify functional dependencies and normalize relations
6. To learn how to write database queries in Structured Query Language
7. To learn what is database transaction
8. To learn what is concurrency control
9. To learn what is NoSQL and why it is important
10. To learn how database concepts and techniques are applied to Cloud Computing and Big Data

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 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 make design tradeoffs between relational and non-relational databases.
- CLO 5 Have the ability to use database concepts and techniques in big data and Cloud Computing.

Required Texts/Readings

Textbook

- [FDS] Ramez Elmasri and Shamkant Navathe, *Fundamentals of Database Systems*, 7/E. Pearson, 2016, ISBN-10: 0133970779, ISBN-13: 9780133970777.
 - <https://www.pearson.com/us/higher-education/program/Elmasri-Fundamentals-of-Database-Systems-7th-Edition/PGM189052.html>Note: 6/E can be used though chapter orders are different.

Other Readings

- [DSC] A. Silberschatz, H. Korth, and S. Sudarshan, *Database System Concepts*, 7/E. McGraw-Hill, 2020, ISBN-13: 9781260515046 or 9781260853223.
 - <https://www.mheducation.com/highered/product/9781260515046.html>
 - <https://www.db-book.com/db7/index.html>
- [7DB] Eric Redmond, and Jim Wilson, *Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement*, 2/E, Pragmatic Bookshelf, 2018. ISBN-13: 9781680502534.
 - <https://pragprog.com/book/pwrdata/seven-databases-in-seven-weeks-second-edition>

Additional reading material will be distributed to the class as appropriate.

Course Requirements and Assignments

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Homework: Each homework is *individual*. See separate document for homework assignment.

Exam and quiz: Midterm Exam, Final Exam, and quiz is *individual* and will be in the form of, but not limited to, multiple choice, short answer questions, design questions, programming questions, etc., and will be based on the individual assignments and course material. Close book; close notes; no calculator.

Projects: See separate document for projects.

Each team consists of a few students and will work on two projects. The first project involves paper-study with in-class presentation. The second project with a self-proposed topic includes research, design, implementation, and testing. Projects have deliverables throughout the semester. Each group member is expected to participate in every phase of the projects. The quality and completeness of all the deliverables will be considered in grading the projects. All projects will be demonstrated in class.

Final Examination or Evaluation

Refer to the Course Schedule for the datetime of the Final Exam.

Grading Information

Except the final course grade which is posted on MySJSU, all other grades (assignments, projects, quizzes, exams) are posted on Canvas.

Student Assessment

Homework and Quiz	15%
Project 1 (paper study) – Report/slides	5%
Project 2 (Term Project)	25%
ER Diagram	5%
Implementation/testing	10%
Report/demo/slides	10%
Midterm Exam	25%
Final Exam (comprehensive)	30%

- The instructor reserves the right to change the percentages.
- *The final grade of this class is solely based on your performance in this class.*
- *Failure to obtain 50% of each component will result in a failing grade in this class.*
- *Receiving 0 point for the SQL queries section during the Final Exam will result in a failing grade in this class.*
- The exam dates are final.

Determination of Grade

Grade	Overall Score
A+	95-100
A	90-94.99
A-	85-89.99
B+	80-84.99
B	75-79.99
B-	70-74.99
C+	65-69.99
C	60-64.99
C-	55-59.99
F	0-54.99

Late Penalty

Based on the clock of Canvas, assignments submitted after the deadline earn no credit.

Makeup Exam

NO makeup exams will be given unless (1) you are pre-approved by the instructor **before** the exam, (2) you have **urgent** medical excuse for yourself (with medical **doctor's written notes covering the exam date**), and (3) you bring the proof to the instructor **within** a week.

Your request **WILL NOT** be granted if you come back after the scheduled exam date and request a makeup exam.

Classroom Protocol

- Students are encouraged to ask questions in the class.
- Each student is required to engage in classroom activities, submit assignments and reports on time, *and* take exams and tests on time.
- Web-browsing in class is not allowed. Cell Phones are to be turned off during lectures and tests. **During exams if you receive a cell phone call or a message of any form, it will be assumed that you have completed your exam and no further work will be allowed.**
- **Audio/video recording, or taking pictures are not allowed.**
- Student causing disruption in the class will be asked to leave the class.

Academic Integrity and Collaboration Policy

The work that you turn in must be **original** - Every single byte must come from you. You are **not** allowed to look at anyone else's solution in any form (from other students, web sites, etc.). You may discuss assignments with any one. But any such discussion is at the high level **only**, and you still must write your solution yourself.

You must take reasonable steps to protect your work. You must **not** share or publish your solutions to any one or at any web sites (github, stackoverflow, etc.), in this semester or any future semester. You are obligated to protect your files and printouts from access. Github repositories are public by default, do not put your code there unless you make the repository private.

Each assignment submission including programming code will be checked for similarity.

Any cheating incident will result in the reporting of such incident to the university office of Student Conduct & Ethical Development, will result in academic sanctions (including failing the course), as well as possible administrative sanctions, in accordance to the [University Academic Integrity Policy](http://www.sjsu.edu/senate/docs/F15-7.pdf) at <http://www.sjsu.edu/senate/docs/F15-7.pdf>.

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.

University Policies

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/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 [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo) (<http://www.sjsu.edu/gup/syllabusinfo>), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.

CMPE 226 Database Design, Section 1, Spring 2020, Course Schedule

The schedule is tentative and subject to change with fair notice. *The final exam date is firm and cannot be changed.* Any changes will be announced in due time in class and on the course's web site. The students are obliged to consult the most updated and detailed version of the reading material and syllabus, which will be posted on the course's web site.

Course Schedule

Week	Date	Topics	References	HW & Projects
1	1/27	Course Logistics & projects		
1	1/29	Big Data	Notes	1/28 Prerequisite due
2	2/3	Concepts and Architecture	FDS-1,2	2/2 Honesty pledge due
2	2/5	The Entity/Relationship Model	FDS-3	2/4 Last day to drop classes
3	2/10	The Entity/Relationship Model (cont'd)	FDS-3	(Team size)
3	2/12	The Entity/Relationship Model (cont'd)	FDS-3	2/11 Last day to add classes
4	2/17	The Relational Model	FDS-5	2/16 Team Formation due
4	2/19	Basic SQL	FDS-6	
5	2/24	Basic SQL (cont'd)	FDS-6	2/23 HW1 due
5	2/26	Basic SQL (cont'd)	FDS-6	2/25 Project 2 Proposal due
6	3/2	SQL: Complex Queries	FDS-7	(Project 1 paper assignment)
6	3/4	SQL: Complex Queries (cont'd)	FDS-7	
7	3/9	SQL: Complex Queries (cont'd)	FDS-7	3/8 Project 2 ERD due
7	3/11	ER to Relational Mapping. HW1 discussion	FDS-9	
8	3/16	HW2 discussion & Review		3/15 HW2 due
8	3/18	MIDTERM EXAM (close book, close notes) Bring student ID	FDS-1~3,5~7,9	
9	3/23	View, Index, Procedure, Trigger	Notes	
9	3/25	Normalization	FDS-14	
10	3/30, 4/1	(no class - Spring Recess)		
11	4/6	Normalization (cont'd)	FDS-14	

Week	Date	Topics	References	HW & Projects
11	4/8	MIDTERM EXAM discussion		(Project 2 presentation length & order)
12	4/13	Transaction Processing	FDS-20	
12	4/15	Transaction Processing (cont'd)	FDS-20	
13	4/20	Concurrency Control	FDS-21	
13	4/22	Concurrency Control (cont'd) Distributed DB	FDS-21 DSC-23	4/21 Project 1 report, slides due
14	4/27	Distributed DB (cont'd) NoSQL	DSC-23 7DB	4/26 HW3 due
14	4/29	NoSQL	7DB	
15	5/4	Project 1 presentations & discussion	Project 1 papers	5/3 Project 2 report, source code, slides due
15	5/6	Project 2 presentations (cont'd)		
16	5/11	Project 2 presentations (cont'd). HW3 discussion		5/11 Last office hours
16	5/13	(no class - last day of instruction 5/11)		
Final Exam	5/18	<u>FINAL EXAM Mon, May 18, 12:15 – 14:30</u> (close book, close notes). Bring student ID	All (including project papers)	

<http://www.sjsu.edu/up/docs/holiday-calendar.pdf>

<http://info.sjsu.edu/static/catalog/final-exam-schedule-spring.html>