

San José State University
College of Science / Department of Computer Science
CS157A, Introduction to Database Management Systems, Section 7, Fall 2018

Course and Contact Information

Instructor:	Dr. Katarzyna Tarnowska
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Office Hours:	Monday & Wednesday, 10:30AM – 11:30AM
Class Days/Time:	Tuesday & Thursday, 10:30AM – 11:45AM
Classroom:	Duncan Hall 450
Prerequisites:	CS 146 (Data Structures and Algorithms) with a grade of C- or better

Course Format

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. will be published on Canvas Learning Management System course login website at <https://sjsu.instructure.com/courses/1270212>. You are responsible for regularly checking with the messaging system through [MySJSU](http://my.sjsu.edu) at <http://my.sjsu.edu> to learn of any updates.

Course Description

Current, classical database systems. Entity-relationship and enhanced entity models. Relational model, algebra, calculus. Current, emerging SQL standard. Embedded, Dynamic SQL. Application perspective on transactions and security. Interactive and programmatic interfaces to database systems. Application programming project using commercial database system. Prerequisite: CS 146 (with a grade of "C-" or better); Computer Science, Applied and Computational Math, or Software Engineering majors only; or instructor consent.

Course Goals

- To introduce students to the purpose of database systems and databases, as well as common users of such systems.
- To teach students about the relational model and relation algebra.
- To teach students about design theory (such as normalization, etc.) and algorithms that help determine if a given database's tables are organized in a reasonable way.
- To teach students about real-world database system usage, architectures and components. Some example systems that might be considered are: Oracle, DB2, MySQL, Postgres, Access, and SQL Server.
- To teach students about SQL, the standard language for interacting with a database.
- To teach students how to interact with a database system from a programming language such as Java, C, PHP, Perl, etc.

Course Learning Outcomes (CLO)

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

1. Write relational algebra queries and predict given a database instance what such a query will return.
2. Design a database by creating Entity/Relationship Diagram for a given problem
3. Being able to identify functional dependencies, check and perform a decomposition in a given normal form
4. Use Data Definition Language to define database schemas.
5. Construct data retrieval procedures using the Data Manipulation Language (schema, index, normalization, view, trigger, constraints). Write SQL commands to create databases, create tables, insert/update/delete/retrieve rows in a common database management system.
6. Implement simple database application and write transactions using JDBC

Required Texts/Readings

Textbook

Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer D. Widom, "Database Systems: The Complete Book", Prentice-Hall, 2nd Edition, 2009, ISBN-13: 978-0-13-606701-6

Or

Jeffrey D. Ullman, Jennifer D. Widom, "A First Course in Database Systems", Pearson, 3rd Edition, 2008

Other Readings

- Database Management Systems (3rd edition) by Ramakrishnan and Gehrke
- Fundamentals of Database Systems (6th edition) by Elmasri and Navathe
- An Introduction to Database Systems (8th edition) by Date

Other readings might be posted on Canvas for the given week in the semester.

Other technology requirements / equipment / material

Microsoft SQL Server

- Microsoft Software for Students Owned Machines at <http://its.sjsu.edu/services/software/microsoft-students/index.html>
- Microsoft's Dreamspark program is currently available to all SJSU students allowing no-cost access to SQL Server – download instructions at <https://sjsu.onthehub.com/WebStore/Welcome.aspx>

Oracle and MySQL

- Oracle Database at <http://www.oracle.com/technetwork/community/students/database/index.html>

IBM DB2

- IBM Data Studio at <https://www.ibm.com/developerworks/downloads/im/data/index.html>
- DB2 Express C at <https://www.ibm.com/us-en/marketplace/ibm-db2-direct-and-developer-editions>

Diagram Design and Application Design

- Microsoft Visio – available to SJSU students under Microsoft's Dreamspark program: <https://sjsu.onthehub.com>
- SAP Power Designer – 30-day free trial version at <https://www.sap.com/products/powerdesigner-data-modeling-tools.html>

Course Requirements and Assignments

- Readings (designated Chapters/Sections) with understanding about new topic each week are required. Lectures will summarize and clarify the reading content. Students are required to know the material in the listed chapters, even if not all of it is covered in the lecture.
- [University Policy S16-9](#): “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 three 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.”
- There will be several assignments (up to 5) within semester to solve problems and turn in paper or online. Instructions will be given later with a fair notice.
- Project will be done within groups of three students. Team formation is expected at the beginning of September. Project topics can be chosen by a team but must be approved by an instructor (description of the application is due no later than 9/27). Project will consist of three milestones due on specific dates:
 - Milestone 1: Description of the project, Database Design: E/R Diagram, logical diagram
 - Milestone 2: Application design: design of menu, modules, physical design
 - Milestone 3: Implementation: server side (stored procedures, triggers) and client-sideThe detailed instructions for the project/milestones will be given later. Project can be completed using the technology of the team’s choice, but the scripts must be executable in the chosen environment. The projects will be delivered by sending reports and source codes, but also demo and short presentation (10 minutes per team at the final lectures).
- Midterm and Final exams will consist of test questions checking theory, but also practical problems to analyze and solve.
- Extra points (up to 10 points) can be received by attending Oracle Open World (October 22-25 2018) in San Francisco and writing a report (2-3 pages) about your discoveries from the event regarding Oracle Database. The report is due no later than a week after attending. The event is free for students: <https://www.oracle.com/openworld/register.html> -> Students Registrations. You will be excused from attending the class on these days once you provide a proof of attendance.

Final Examination or Evaluation

The midterm and final examinations will be closed book and no notes. There will be no laptops, or any personal digital devices allowed. There will be no make-up exams. If a student misses an exam without a legitimate excuse, a grade of zero will be recorded. If a student missed an exam with a legitimate excuse, then an appropriate documentation must be provided beforehand.

Grading Information

Determination of Grades

The components of the final grade will be distributed as follows:

- Midterm 30% 30 points
- Final 30% 30 points
- Project 30% 30 points
- Assignments 10% 10 points

Letter grades will be assigned according to the following policy:

100– 99-----A+
93 – 98 ---- A
89 -- 92 ---- A-

87 -- 88---- B+
83 -- 86 ---- B
80 -- 82 ---- B-
77 -- 79 ---- C+
73 -- 76 ---- C
70 -- 72 ---- C-
67 -- 69 ---- D+
63 -- 66 ---- D
60 -- 62 ---- D-
0 -- 59 ---- F

- Each assignment, project, and exam will be scored (given points) but not assigned a letter grade.
- Final individual class letter grades can be adjusted based on the class curve.
- Your final class grade can be adjusted up or down depending on your level and quality of class / project performance.
- No late work or make-ups accepted.

Classroom Protocol

- Attendance: students should attend all meetings of their classes ([University Attendance and Participation Policy F15-12](#)).
- Arrival: students are expected to arrive on time.
- Behavior: eating, personal loud discussions, cell phones are not allowed in the classroom.
- Policy on Academic Integrity
“Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The [University Academic Integrity Policy F15-7](#) requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. Visit the [Student Conduct and Ethical Development](#) website for more information.”
 - Any cheating on an exam will result in a grade of F in the class.
 - For the project, no collaboration outside own group is allowed.
 - If duplicate programs/assignments are found, both the provider and the copier will receive 0 point on the assignment/project. A second offense results in a grade of F in the class.
 - Any incident of academic dishonesty may be reported to University for disciplinary action.

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/>.

CS157A / Introduction to Database Management Systems, Fall 2018, Course Schedule

Course Schedule

The schedule is subject to change with fair notice available to registered students through Canvas.

Week	Date	Topics, Readings, Assignments, Deadlines
1	8/21	Introduction to course
1	8/23	Introduction to DBMS, Chapter 1
2	8/28	Relational Model, Chapter 2.1-2.3
2	8/30	Relational Model, Chapter 2.1-2.3
3	9/4	Relational Algebra, Chapter 2.4, 5.1-5.3
3	9/6	Relational Algebra, Chapter 2.4, 5.1-5.3, Project group formation
4	9/11	Functional Dependencies, Normalization, Chapter 3.1-3.4
4	9/13	Functional Dependencies, Normalization, Chapter 3.1-3.4
5	9/18	Multivalued Dependencies, 3NF, 4NF, Chapter 3.5-3.7
5	9/20	Multivalued Dependencies, 3NF, 4NF, Chapter 3.5-3.7
6	9/25	Entity/Relationship Model, Chapter 4.1-4.6
6	9/27	Entity/Relationship Model, Chapter 4.1-4.6, Project Milestone 0 due
7	10/2	More E/R, UML, Chapter 4.7-4.10
7	10/4	Midterm
8	10/9	Introduction to SQL, Chapter 6.1-6.3
8	10/11	Introduction to SQL, Chapter 6.1-6.3, Project Milestone 1 due
9	10/16	Advanced Relational Algebra and SQL, Chapter 5.4, 6.4-6.5
9	10/18	Advanced Relational Algebra and SQL, Chapter 5.4, 6.4-6.5
10	10/23	Constraints and Triggers, Chapter 7
10	10/25	Constraints and Triggers, Chapter 7
11	10/30	SQL Transactions, Views and Indexes, Chapter 6.6, 8
11	11/1	SQL Transactions, Views and Indexes, Chapter 6.6, 8
12	11/6	Persistent Stored Modules (PSM), PL/SQL, Embedded SQL, Chapter 9.3-9.4
12	11/8	Persistent Stored Modules (PSM), PL/SQL, Embedded SQL, Chapter 9.3-9.4
13	11/13	JDBC, PHP, CLI

Week	Date	Topics, Readings, Assignments, Deadlines
13	11/15	JDBC, PHP, CLI, Project – Milestone 2 due
14	11/20	Advanced Topics in Relational Databases: Authorization, Chapter 10.1
14	11/22	Thanksgiving – Campus Closed
15	11/27	Object-Relational Databases, Chapter 10.3
15	11/29	OLAP, Data Cubes, Warehousing, Chapter 10.6-10.7
16	12/4	Project – Milestone 3 due, Project demos
16	12/6	Project demos, review (time permits)
Final Exam	12/12	DH 450, 9:45AM-12PM