San Jose State University
College of Science
Department of Computer Science
CS157A, Introduction to Database Management Systems, Sections 1 and 2, Fall2017

Course and Contact Information

- Instructor: Dr. Kim
- Office Location: MacQuarrie Hall 217 (MH217)
- Telephone: 408-924-5122
- E-mail: suneuy.kim@sjsu.edu (Preferred mode of contact is via email.)
    - When you send me an e-mail to ask a question, use [Q] in a subject line to get a reply from me within a reasonable response time. Here is an example subject line to ask a question.

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      [Q] lecture note
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- Office Hours: TW 9:20 - 10:20 in MH217
- Class Days/Time/Classroom
    - Section 1 (Lecture): MW 1030-1145 MH225
    - Section 2 (Lecture): MW 1200-1345 MH225
- Course Prerequisites: CS146
- Course Web Site at http://www.cs.sjsu.edu/~kim/cs157a
  Announcements and course materials will appear here. It is updated frequently. You are strongly encouraged to check out this course web page regularly.

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.

Course Objectives

- 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.

Student Learning Outcomes

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

- Write relational algebra queries and predict given a database instance what such a query will return.
- Write SQL commands to create databases, create tables, insert/update/delete/retrieve rows in a common database management system. Use a database management system's bulk loader to populate a database.
- Write simple transactions using JDBC and ODBC, or similar programmer interfaces in other languages.
- Know the algorithms for testing if a decomposition is in a given normal form and the algorithms which given a set of functional dependencies can do table decomposition into 3NF or BCNF

BS in Computer Science Program Outcomes Supported

These are the BSCS Program Outcomes supported by this course:

- An ability to apply knowledge of computing and mathematics to solve problems
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- An ability to use current techniques, skills, and tools necessary for computing practice

Course Topics

Topics	Chapters
Introduction to Database Systems Concepts	1
Relational Databases	2
Relational Algebra	2, 5
SQL	6
Constraints and Triggers	7
JDBC	N/A
Views and Indexes	8
Transactions	6
Relational Design Theory	3
High-Level Database Models (if time permits)	4
Semistructured-Data Model (XML Data)	11
Querying XML	12
OLAP (On-Line Analytical Processing) (if time permits)	N/A
JSON (Javascript Object Notation) (if time permits)	N/A

Required Texts/Readings

- Textbook
  Database Systems: The Complete Book (2nd edition) by Garcia-Molina, Ullman, and Widom
- Textbook web site: http://infolab.stanford.edu/~ullman/dscb.html
- References
  - Database Management Systems (3rd edition) by Ramakrishnan and Gehrke
  - Fundamentals of Database Systems (6th edition) by Elmasri and Navathe
  - Database System Concepts (6th edition) by Silberschatz, Korth, and Sudarsha

Course Requirements and Assignments

- Assignments: On-line Quizzes/Interactive Exercises offered by Stanford University
  - On-line submissions can be made multiple times, but only the last submission will be used.
  - Deadline is 11:30 pm on the given due date unless otherwise noted.
  - E-mail submissions will not be accepted.
- Project
  - A team project will be given in the middle of October. Form a group of three for the project.
  - The project involves database design and modeling, creation, data population, query, and database application programming using JDBC.
  - Your project/team will be submitted through the project submission link on the course web site.
- Late Policy
  - No late submission is accepted for the quizzes/interactive exercises.
  - Any project turned in past the deadline will get a penalty: For each late day, a 20% of the maximum obtainable score of the work will be taken out of what you earned. (a late day is one 24 hour period beyond the due date). For example, suppose the maximum score of an assignment is 100 and you earned 80 points. If the submission is late by two days, the final score of the assignment would be 80 - 2 * 20 = 40.
  - Any submission turned in more than 48 hours past the deadline will result in a grade of zero for that assignment.
- Software
  - MySQL (Community Server) (http://dev.mysql.com/downloads/mysql/)
- XML Editing and Validation Tool: XML Copy Editor at http://xml-copy-editor.sourceforge.net/
- XSLT and XQuery Processor: SAXON at http://saxon.sourceforge.net/
- GUI Interface to use SAXON: Kernow at http://kernowforsaxon.sourceforge.net/

Evaluation (Exams)

- There will be one midterm exam and one comprehensive final exam. The exams are scheduled as below. The date of midterm exam is subject to change with fair notice, but the final exam date is firm and cannot be changed.
  - Midterm: TBA
  - Final Exam:
    - Section 1 (MW 10:30 class): Friday, December 15 0945-1200
    - Section 2 (MW 12:00 class): Tuesday, December 19 0945-1200
- Makeup Exam Policy

Absolutely no make-up exams will be offered under any circumstances. For those who couldn't take the exam or worked hard but had a bad day on the exam day ending up with a low score, I offer the following opportunity to possibly replace your worst midterm score with the final score. If your final exam (percentage) grade is higher than your worst midterm (percentage) grade, then I will replace the worst midterm grade with your final exam grade. For example, if you have a 60% on your worst midterm and you receive an 80% on the final exam, I will replace the 60% by 80% in the computation of your course grade.

Grading Information

You will receive the final grade based on the weighted average score on your performance. The grading weights are as follows.

- Quizzes: 3%
- Interactive Exercises: 12%
- Midterm: 30%
- Final Exam: 35%
- Project: 20%

I first try scores of 90, 80, and 70 to cut off letter grades of A-, B-, and C-, respectively. If overall class performance is too low to use these cut offs, I set a cut off of C- to a lower score than the class total average but a higher score than 60 (this number may change), and divide the students' group above the cut off of C- into A+, A, A-, B+, B, B-, C+, C, C-. The rest of students will be given by a grade of D+, D, D-, F or WU depending on their class performance.

Classroom Protocol

- Policy on Academic Integrity
  - Any cheating on an exam will result in a grade of F in the class.
  - If duplicate programs are found, both the provider and the copier will receive 0 point on the assignment. A second offense results in a grade of F in the class.
  - Any incident of academic dishonesty will be reported to University for disciplinary action.
- Attendance: University policy F15-12 at http://www.sjsu.edu/senate/docs/F15-12.pdf states that "Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading."
- Consent for Recording of Class and Public Sharing of Instructor Material : University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructorâ€™s permission to record the course:
  - "Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructorâ€™s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material."
  - "Course material cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent."

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 Programsâ€™ Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/â€

CS157A Introduction to Database Management Systems, Fall 2016: Semester Schedule

Subject to change with fair notice.

Weeks	Dates	Topics	Assignments
1	8/23	CS157A Orientation	
1	8/28	Introduction to Database Systems Concepts	
2	8/30	Relational Databases and Relational Algebra	
	9/4	Labor Day	
2	9/6	Relational Algebra	Relational Algebra
3	9/11	MySQL	
3	9/13	SQL Programming	
4	9/18	SQL Programming	
4	9/20	SQL Programming	
5	9/25	SQL Programming	SQL programming
5	9/27	Constraints and Triggers	
6	10/2	Constraints and Triggers	
6	10/4	Constraints and Triggers	
7	10/9	Views and Indexes	
7	10/11	Views and Indexes	
8	10/16	Views and Indexes	Constraints, Triggers, Views and Indexes
8	10/18	JDBC	
9	10/23	JDBC	Team Project
9	10/25	Transactions	
10	10/30	Transactions	
10	11/1	MIDTERM (tentative)	
11	11/6	Semistructured Data Model	
11	11/8	Semistructured Data Model	
12	11/13	Project Presentation and Demo	JSON (with a tutorial video) and Transactions
12	11/15	Project Presentation and Demo	

13	11/20	Semistructured Data Model	
	11/22	Non-Instruction Day	
13	11/27	Querying XML	
14	11/29	Querying XML	
14	12/4	Querying XML	
15	12/6	Relational Design Theory	
15	12/11	Relational Design Theory, LAST DAY OF INSTRUCTION	
Final Exam		See the Evaluation Section above for the date and time.	