CSC/CPE 366: Database Modeling, Design and Implementation
Spring 2019
Course Syllabus

April 1, 2019

Instructor: Alexander Dekhtyar
email: dekhtyar@calpoly.edu
office: 14-210

Days	Lecture		Lab	
MWF	11:10 – 12:00pm	14-250	12:10pm – 1:00pm	14-256

Office Hours

	When	Where
Monday	9:00am - 11:00am	14-210
Tuesday	1:00pm - 2:00pm	14-210
Friday	10:00am - 11:00am	14-210

Additional appointments can be scheduled by emailing the instructor at *dekhtyar@calpoly.edu*.

Overview

This course will explore a variety of topics related to design and implementation of database applications. During the course, the students will learn the techniques for building relational database models for applications and tuning database design for best performance, will obtain experience in building an actual database application and will learn the basic concepts of non-relational database modeling and work with non-relational database management systems.

Texbook

Required: *Database Systems: The Complete Book (3rd Edition)*, Jeffrey D. Ullman, Jennifer Widom, Hector Garcia-Molina, 2009, Prentice Hall.

Alternative: *A First Course in Database Systems (3rd Edition)*, Jeffrey D. Ullman, Jennifer Widom, 2007, Prentice Hall.

Topics

The following will be covered in the course.

No.	Topic	Duration (weeks)
1.	Introduction: Database Modeling	1
2.	Conceptual Modeling using Entity-Relationship models	2
3.	Database Tuning, Functional Dependencies, Theory of Normal Forms	2
	Midterm	Topics 1 – 3.
4.	Data Warehouse design	1
4.	Database Security	1
5.	Non-Relational Database Design	3
	Final Exam	Comprehensive

Most of the topics will be covered in the order specified above, but some variations are possible during the course.

Grading

Homeworks	0 - 5 %
Labs and Project	35-50%
Exams	40-50%

I give relatively hard problems and take points off on exams. Because of this, the traditional 90-A, 80-B, 70-C grading schema does not work in my classes. Historically, the A/B cutoff has been around 80-85%, while the B/C cutoff has been around 70%.

Course Policies

Exams

The course will involve a lot of project-related activities during the Finals week, therefore, we will not have a final exam (which would otherwise have to take place on Wednesday).

Instead, there will be two midterm exams scheduled for the following dates:

1. Midterm 1: (tentative date) *Monday, May 6* (or any other class during Week 6).
2. Midterm 2: *Friday, June 7.*

Make-up exams will not be given, *unless there are extraordinary circumstances present and I am notified in advance.* The policy regarding the use of textbooks and notes will be announced at least one week prior to each exam. (Typically, I allow a single cheat sheet on all my exams).

Labs and project

Practical knowledge of the database modeling techniques and practical experience in building database applications will be conveyed through labs and the course project.

Lab 1 is designed to test your knowledge of SQL. Unlike previous years, where Lab 1 was administered more as a quiz, this time Lab 1 is a week-long lab.

Labs 2 – 5 are *design labs* for the course project (see below). These labs will run through *the end of Week 6* of the course.

During the last four weeks of the quarter, additional *standalone labs* may be given on occasion to provide hands-on experience with non-relational database design and with the work of non-relational DBMS. In parallel with the standalone labs you will be working in your teams on the project – some of the lab periods will be dedicated to team work and meeting with the customer.

Each lab assignment will span 2-4 lab sessions. Each lab assignment is due by the end of lab period on the due date (unless specified otherwise). You are welcome to work on the lab assignments outside the lab hours, however, **lab period attendance is mandatory**. Project-related lab assignments will be done in groups formed at the beginning of the course. Standalone lab assignments will either be individual or group – this will be stated on each assignment explicitly.

Project. This course involves a quarter-long team project which will require each team to go through all the steps of database application modeling, design and implementation. The project will have an outside customer, and the goal of the project is to produce a working, *usable* prototype of the database application, which the customer can adopt, further extend and enhance after the delivery. At the beginning of the quarter, you will have opportunities to interact with the customer and learn about the application desiderata (requirements) from him. Throughout the course, you will have opportunity to consult the customer. This should allow you to fine-tune your application design to the customer needs.

This year, we have one customer and all teams will be working on the same project. However I reserve the right to *individualize* the assignments of different groups. The specifical individualizations may involve language of implementation, added stress on certain features, or certain categories of users, use of advanced database modeling techniques, or implementation of additional use cases.

Homeworks

In addition to labs, a number of paper-and-pencil homeworks will be assigned. Homeworks will typically consist of problems taken from database textbooks, or similarly styled problems. The primary purpose of the paper-and-pencil homeworks is preparation for exams. Not all homeworks (or not all problems in a given homework) may end up being graded.

Senioritis

For some of you, this may be the last quarter at Cal Poly. CSC 366 is a technical elective, and therefore, I occasionally observe the attitude of "I am done here, see ya'll" on the part of graduating seniors when this class is offered in the Spring quarter.

Please know this:

1. The core of the class is a **team project**. Do not stand up your teammates.
2. Your project will have a real outside customer, and the outcomes of the project may be used for an actual deployment. You are expected to treat this as real **professional engagement**, like those you are about to start having in your professional career. Think of this as a *precursor* for what is coming, **not** as the last class that stands between you and piles of money.

If any behavior due to *senioritis* becomes detrimental to your team, I will not hesitate to lower grades accordingly.

Late Submissions

All assignments, unless stated otherwise, are due at classtime on the due date: homeworks - at the beginning of the class (with grace period extending to the beginning of the lab period); lab assignments - at the end of the lab period. Any deviations from these rules will be spelled out explicitly in the assignments.

Homework/lab assignments submitted later than indicated above will be considered *late submissions*.

If paper-and-pencil homework solutions are distributed on the due date of the homework, ***late homework submissions will not be accepted***. Otherwise, late homeworks can be submitted during next 24 hours for a 10-30% penalty (the exact amount will depend on the submission time and the specific circumstances). No homework submissions will be accepted afterwards.

Late lab assignment submissions can be turned in before or at the beginning of the next lab period for a 10-30% penalty (the exact amount will depend on the submission time and the specific circumstances[1]). No lab assignment submissions will be accepted after that.

[1] The penalty will be larger if the gap between the two lab periods includes a weekend and smaller otherwise

Communication

The class has the following official mailing list

csc-366-01-2194@calpoly.edu

I encourage questions during classtime and questions via email. My answers to email questions may be broadcast to the entire class via the mailing list, if the answer may be relevant to everyone (e.g. a correction in a text of a handout, or a clarification of a homework problem), and may also appear on the web page. The questions can also be posted to the mailing list directly. The mailing list will also be used for all annoucements related to the course. It is your responsibility to read your class-related email. Failure to read email posted to cs405001 mailing list cannot be used as an excuse in the class.

Web Page

Class web page can be found at

http://www.csc.calpoly.edu/∼dekhtyar/366-Spring2019/

Through this page you will be able to access all class handouts including homeworks, project information and lecture notes.

Academic Integrity

University Policies

Cal Poly's Academic Integrity policies are found at

http://www.academicprograms.calpoly.edu/academicpolicies/Cheating.htm

In particular, these policies define *cheating* as (684.1)

> "*. . . obtaining or attempting to obtain, or aiding another to obtain credit for work, or any improvement in evaluation of performance, by any dishonest or deceptive means. Cheating includes, but is not limited to: lying; copying from another's test or examination; discussion of answers or questions on an examination or test, unless such discussion is specifically authorized by the instructor; taking or receiving copies of an exam without the permission of the instructor; using or displaying notes, "cheat sheets," or other information devices inappropriate to the prescribed test conditions; allowing someone other than the officially enrolled student to represent same.*"

Plagiarism, per University policies is defined as (684.3)

> "... the act of using the ideas or work of another person or persons as if they were one's own without giving proper credit to the source. Such an act is not plagiarism if it is ascertained that the ideas were

> arrived through independent reasoning or logic or where the thought or idea is common knowledge. Acknowledgement of an original author or source must be made through appropriate references; i.e., quotation marks, footnotes, or commentary."

University policies state (684.2): "Cheating requires an "F" course grade and further attendance in the course is prohibited." (appeal process is also outlined, see the web site above for details.). Plagiarism, per university policies (684.4) can be treated as a form of cheating, although a level of discretion is given to the instructor, allowing the instuctor to determine the causes of plagiarism and effect other means of remedy. It is the obligation of the instructor to inform the student that a penalty is being assessed in such cases.

Course Policies

All homeworks are to be completed by each student **individually**. Lab assignments are to be completed by the appropriate units (individual, pair, group), and no code/solution-sharing between units is permitted. Students are encouraged to discuss class content among themselves but NOT in a manner that constitutes plagiarism and cheating as defined above (e.g., you can solve together a problem from the textbook that had not been assigned in the homework, but you should solve assigned problems individually).