CSC/CPE 366: Database Modeling, Design and Implementation
Spring 2022
Course Syllabus

March 29, 2022

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office: 14-210

<table>
<thead>
<tr>
<th>Days</th>
<th>Lecture</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR</td>
<td>12:10 – 1:30pm</td>
<td>12:10pm – 1:00pm</td>
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<td></td>
<td>20-140</td>
<td>20-127</td>
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</tbody>
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Office Hours

When       Where
Monday 9:00am - 10:00am 14-212
Tuesday 9:00pm - 10:00pm 14-212
Friday 9:00am - 11:00am 14-212

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.

Textbook


**Topics**

The following will be covered in the course.

<table>
<thead>
<tr>
<th>No.</th>
<th>Topic</th>
<th>Duration (weeks)</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Introduction: Database Modeling</td>
<td>1</td>
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<tr>
<td>2.</td>
<td>Conceptual Modeling using Entity-Relationship models</td>
<td>2</td>
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<tr>
<td>3.</td>
<td>Database Tuning, Functional Dependencies, Theory of Normal Forms</td>
<td>2</td>
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<tr>
<td></td>
<td><strong>Midterm</strong></td>
<td><strong>Topics 1 – 3.</strong></td>
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<td>4.</td>
<td>Data Warehouse design</td>
<td>1</td>
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<td>4.</td>
<td>Database Security</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Non-Relational Database Design</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Final Exam</strong></td>
<td><strong>Comprehensive</strong></td>
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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 Thursday, June 9).

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

1. **Midterm 1**: (tentative date) *Tuesday, May 3* (or Thursday, May 5).
2. **Midterm 2**: *Thursday, June 2*.

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.

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 specific 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.

Communication

Slack. Our main communication channel this quarter is Slack. Please sign up for the Slack workspace for the course - invitations have been sent. Our course customers will also be available for questions and discussions on the Slack.

\(^1\)The penalty will be larger if the gap between the two lab periods includes a weekend and smaller otherwise
**Mailing List.** The class has the following official mailing list

    csc-366-01-2224@calpoly.edu

    We will use the mailing list sparingly after everyone is on Slack, but to ensure that you see important messages they sometimes may be conveyed through the mailing list.

**Web Page**

Class web page can be found at

    http://www.csc.calpoly.edu/~dekhtyar/366-Spring2022/

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

**COVID-19 Context**

We will start the course masked. During week 1 I will conduct a survey, part of which will deal with the overall comfort of everyone in the class with different in-class arrangements. I will make the decision on how to proceed in Weeks 2 - 10 based on (a) the overall level of comfort of students the course, and (b) the overall COVID-19 situation on campus and in the community. Please be aware that Cal Poly's regulations w.r.t. COVID-19 may change throughout the quarter.

**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 instructor 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).