CSC 468: Database Management System Implementation
Winter 2009
Course Syllabus

January 2, 2009

Instructor: Alexander Dekhtyar
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What	When		Where
Lecture	MWF	3:10 – 4:00pm	186-C303
Lab	TR	4:10 – 5:00pm	14-257
Final Exam	March 16 (Monday)	1:10 - 4:00pm	186-C303

Office Hours

	When	Where
Monday	1:30pm - 2:30pm	14-215
Wednsday	9:00am - 12:00pm	14-215
Thursday	3:00am - 4:00pm	14-215

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

Description

The goal of the course is to give students hands-on knowledge of the organization and inner workings of modern database management systems. The course concentrates on issues of physical and logical organization of data in a DBMS, query processing, transaction management and concurrency control and crash recovery.

Learning Objectives

After taking the course the students are expected to

- understand how information is stored in DBMS
- be able to implement information indexing techniques
- understand query processing in DBMS, be able to solve query optimization problems
- be able to use their knowledge of concurrency control protocols to solve transaction scheduling problems
- be able to simulate the work of ARIES algorithm for crash recovery in relational databases.

Texbook

Database Systems. The Complete Book, H. Garcia-Molina, J.D. Ullman, J. Widom., 2002, Prentice Hall.

or

Database System Implementation, H. Garcia-Molina, J.D. Ullman, J. Widom, 2000, Prentice Hall.

Topics

No.	Topic	Duration (weeks)	Material
1.	Storage of information in DBMS	2	Chapters 12,13,14
2.	Query Processing	3	Chapters 16, 17
MIDTERM			
3.	Transaction Management	1	Chapters 8, 18, 19
4.	Concurrency Control	2	Chapter 18
5.	Crash Recovery	1	Chapter 17
FINAL (conprehensive)			

Grading

Labs and Homeworks	10-20%
Project	30-40%
Midterm Exam	15 - 20%
Final Exam	25 - 35%

Course Policies

Prerequisites

The prerequisite for **CSC 468** is **CSC/CPE 365** or an *eqivalent* undergraduate course in databases from another school.

In this course, I will assume that you are familiar with the main concepts studied in an undergraduate database course. In particular, I will assume familiarity with ***Relational Database model*** and **SQL**.

The first lab of the course is used to test your knowledge of SQL, and your ability to work with Oracle DBMS using `sql*plus` environment.

Labs, Project, Homeworks

Project. The course will have a quarter-long group project devoted to an implementation of a simple (but real) DBMS. The project will be organized in a number of stages, each stage will be graded and will receive a score that counts towards the total project score, although opportunities to fix problems with earlier deliverables will be given.

Labs. Labs will be used to facilitate the course project and to test some of the knowledge obtained in lectures. In the first half of the course labs will be devoted to project setup and preparation issues: study of the packages, technologies, APIs and query languages needed for the project. Prior to the direct use of this information in the project, a lab will be offered to get you familiarized with the necessary concepts. In the later parts of the course, labs will target some of the theoretical and practical material learned in the lectures (such as query optimization and transaction processing).

Most of the labs will be team-based (to be performed by the project teams). Occasional lab periods may be used for project discussions/demos or as a group meeting time for the project.

We will try to align lab assignments with weeks, but this is not guaranteed. 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**. *You may only leave the lab period (a) with the express permission of the instructor if (b) the current assignment is complete and the next assignment has not been made available yet.*

Homeworks. Paper-and-pencil homeworks will be assigned occasionally. The main purpose of the homeworks is preparation for the exams.

Late Submissions

Typically, paper-and-pencil homeworks are due in class, labs are due at the end of the lab period on the due date and project stages are due at midnight of the due date. Exact assignment/project submission instructions will be included with the assignments. Be sure to follow exactly the submission procedures. Homework/projects submitted later than indicated will be considered *late submissions.*

Late paper-and-pencil ***homework*** *submissions* will not be accepted.

Late ***lab*** *and* ***project*** *submissions* are strongly discouraged. A penalty of 10 - 30% will be assessed for any submissions that are late by less than 24 hours. No credit will be given for any later submissions. You are encouraged to submit your code on time even if it is not perfect. You can then debug your code and submit a fixed version late, subject to the abovementioned rules. When more than one submission is present, we will independently grade two submissions: (i) the latest on-time submission and (ii) the latest late submission for which non-zero credit can be assessed. Your grade for the project will be the **maximum** of the two grades.

Communication

The class will have an official mailing list. The email address for the mailing list is *csc-468-01-2084@calpoly.edu*. All students enrolled in the class are automatically subscribed to the mailing list (using the email addresss that the CS department has on file). You are allowed to tranfer the subscription to another account (e.g., CSLAB account). However, you must stay subscribed to the mailing list for the entire duration of the class.

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 cs505001 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/468-Winter2009

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

Links to additional information, and notes and announcements will also be posted.

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).