CS 445: Introduction to Database Systems

Course Syllabus
Fall 2017

Introduction

An introduction to both the theory and application of Database Management Systems. Topics covered will include database design including normalization and optimization, the relational model, security, transaction management, and the query language SQL. Distributed and web architectures will be discussed. All topics in the course will be implemented concretely using a modern DBMS. Prerequisite: CS 300 with a minimum grade of C. 4 credits.

Topics

The Relational Model	Concurrency	IM/InformationModels	IM/Indexing
ER Diagrams	Security	IM/PhysicalDatabaseDesign	IM/DataModeling
Relational Algebra	MySQL	IM/TransactionProcessing	IM/DatabaseSystems
Indexing	SQL	IM/RelationalDatabaseDesign	
Query Evaluation	Web enabled databases	IM/RelationalDatabases	
Transaction Management	LAMP	IM/QueryLanguages	

Many of the above topics were copied with permission from the Computing Curricula 2008 recommendations found at:http://www.acm.org/education/curricula/ComputerScience2008.pdf.

Student Learning Outcomes (from http://www.acm.org/education/CS2013-final-report.pdf)

- Explain the characteristics that distinguish the database approach from the approach of programming with data files.
- Cite the basic goals, functions, and models of database systems.
- Use a declarative query language to elicit information from a database

This course also provides the following learning outcomes for the *CS* major or program: https://www.pacificu.edu/current-undergraduate/academics/majors-minors/computer-science/student-learning-outcomes

- Apply strategies for abstract problem solving
- Be able to communicate in a collaborative environment, present ideas, and document work at all stages of software development.

Grade Breakdown

		92-100	A	90-92	A-
88-90	B+	82-88	B	80-82	B-
78-80	C+	72-78	C	70-72	C-
68-70	D+	60-68	D		
		0-60	F		

Percent Breakdown

Midterm 1	15%	
Midterm 2	15%	
Final Exam	20%	
Homework/Quizzes	10%	
Programming Projects	40%	
	First DB Assignment	20 pts
	Design Documents	25 pts
	MySQL Database	30 pts
	Web Interface	15 pts
	Presentations	10 pts

Database Projects

This course will consist of two data base programming projects. The first will be an individual project that requires the student build a small database outlined by the instructor. The student will also need to produce a set of SQL queries to process the data.

The second assignment will be a group project that requires the group to design a database from the ground up. This includes producing documentation, not limited to ER diagrams, describing the database, implementation, and functionality presented to the user. This database will need a web interface. We will discuss how to do this with PHP and the Apache webserver in class. This assignment will be broken down into various milestones. At the end of the semester each group will need to present the database project to the class. This should be a presentation of between 7 and 10 minutes describing the data and relationships in the database as well as a demonstration of the Web GUI. You MUST use some form of revision control (e.g. Subversion or Git) to manage your group project. The instructor will set you up with a shared repository on Zeus if you like.

All practical database work will need to be done using MariaDB. This is a free download.

For individual projects do not allow any other student see your source code.

Details on how to submit each assignment will be specified later.

Version Control

When you use version control, your master repository must not be publicly available. You are welcome to host an SVN or Git repository on your personal account on Zeus or to use a private repository on GitLab or GitHub. If you use a private repository on GitLab or GitHub, you must allow only yourself and the instructor access (chaddcw) to your repository.

Academic Dishonesty

The cheating policy is defined in the Pacific Catalog as well as the Academic Policy that each of you signed upon entering Pacific University. Be sure you read or reread this policy carefully. All code written for our course is to be an original design and an original implementation. The Web, textbooks, and any other references are simply references for you. Copying source code from any source is prohibited.

Further, source code for individual projects is not to exchange hands in any form or by any medium except when sending your solutions to the instructor. It is acceptable to share high level ideas during the design phase, share information dealing with OS issues, debugger issues, in general, development issues that do not involve code writing.

Specific solutions to homework problems should not be discussed with any other students. The solutions should be an individual effort unless otherwise specified on the assignment. As with coding, high level concepts can be discussed. However, do not discuss specific homework problems or solutions.

If you have any question as to whether or not what you are about to do constitutes cheating, ask the instructor.

Course Policies

- Assignments are to be submitted, electronically and as a hard copy, by 11:59pm on the day in which they are due (unless otherwise specified). Late assignments will not be accepted. Start your assignments early. While no C or C++ code will be required in this class, SQL queries and PHP code can take much longer than you think to write. You may turn each assignment exactly once.
- Any assignment turned in without your name attached will receive a grade of zero.
- Grade Complaints: If you have a complaint regarding a grade on an assignment, exam, or homework, write a one paragraph description of why you feel the grade is incorrect and deliver it to the instructor. The paragraph must be delivered to the instructor within one calendar week of when the graded material is returned to the student.
- Quizzes: A number of unannounced, open-notes quizzes will be given during the semester.
- No early or late exams/finals will be given.
- No incompletes will be given.
- Neither computer failure, software failure, nor lack of computer access are accepted as excuses for late programs; therefore, start work on the programs as soon as they are assigned, don't put them off until the last minute. Further, corruption of programs due to bad disk media is also not accepted as an excuse for late programs; therefore, always keep a current backup of all programs on a separate disk. The Database machine is not backed up! You should be using some revision control software (such as Subversion) to manage your code (SQL scripts, php, html).
- The instructor reserves the right to raise or lower a student's grade based on class participation and attendance.
- I do not want to hear any electronic devices go off during lecture; therefore, make sure you silence these devices before lecture starts.
- Class starts promptly at 2:45pm. Your attendance is expected at each class meeting. It is in your own best interest to attend class, as your grade will almost certainly suffer indirectly if you choose not to attend. In addition, I reserve the right to consider attendance in instances of borderline grade assignments. Of course, excused absences (sickness, family emergencies,

varsity athletic participation) will not be held against you. Scheduled absences should be communicated to me well in advance. If you must miss a class, be sure to check with me or another student to get what you missed. Exams will be given in class on the day scheduled and may not be made up. The material in the course is, by necessity, cumulative. Be warned that if you fall behind, you will not be able to catch up easily.

- If you have a documented disability covered under the ADA then services and accommodations are available from LSS (Learning Support Services). If you need reasonable accommodations to fully participate in course activities or meet course requirements you must contact the Director of LSS , at X2107.

Important Dates

Midterm
Sept 28

Midterm
Nov 2

Final Exam
Tuesday Dec 12, noon-2:30pm

Campus Calendar:
http://pacificu.edu/as/calendar/

Resources

Textboox -- Database Management Systems, 3rd Edition, Ramakrishnan & Gehrke

Apachefriends http://www.apachefriends.org/

MariaDB http://mariadb.org

Server db.cs.pacificu.edu / 64.59.233.245 (on campus, use your zeus password)

Other useful texts:
(not-required)
SQL Antipatterns: Avoiding the Pitfalls of Database Programming
ISBN: 978-1-93435-655-5
http://pragprog.com/book/bksqla/sql-antipatterns

PHP and MySQL Phrasebook
ISBN-13: 978-0321834638

Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement
ISBN: 978-1-93435-692-0
http://pragprog.com/book/rwdata/seven-databases-in-seven-weeks

Instructor Details		**Course Basics**	
Professor	Chadd Williams	**Course Title**	CS445 Introduction to Database Systems
Email	chadd@pacificu.edu	**Meeting Times**	TTH 2:45-4:20
Office	Strain 202	**Location**	Scott 204
Phone	(503) 352-3041	**Textbook**	Database Management Systems, 3rd Edition, Ramakrishnan & Gehrke http://pages.cs.wisc.edu/~dbbook/
Office Hours	MW 10:30-11:30 am Th 1-2pm	**Website**	http://zeus.cs.pacificu.edu/chadd/cs445f17
		Official Clock	http://time.gov/timezone.cgi?Pacific/d/-8/java