WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

Course Syllabus

Course Subject, Number and Title
COMPSCI 564, Database Management Systems: Design and Implementation

Credits
4 credits

Canvas Course URL:
https://canvas.wisc.edu/courses/197187

Meeting Time and Location
Online synchronous lectures MW 9:30 am -12:10pm on BB Collaborator. Videos will be available after lectures.
Online discussion W 5-6pm via BB Collaborator

Instructional Mode
All online

Specify how Credit Hours are met by the Course
4 credit hours are met by 42 hours of online instruction, 16 hours of office hours, 8 hours of discussion, 12 hours of project presentation, and approximately 13 hours/a week for reading, homework, lab, exam and projects over 8 consecutive weeks.

INSTRUCTORS AND TEACHING ASSISTANTS

Instructor:

Dr. Hien Nguyen.
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Teaching Assistant

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Discussion hours: Wednesdays 5-6pm on BB Collaborate Ultra

OFFICIAL COURSE DESCRIPTION

Course Description

Welcome to CS 564, Database Management Systems: Design and Implementation. This is one of the fundamental topics in Computer Science. In this course, we will focus on basic database techniques and development of a database application. Having a solid background and experience in database will help us in design and implementation any applications that involve the use of a database.

CS 564 is intended to give students a solid background in database management systems, particularly relational database management systems. Such systems will be examined from two perspectives: that of a database system user, and that of a database system implementer. Approximately half of the course material will focus on the use of database management systems. We will cover the concept of a data model, the entity-relationship model, the relational data model and the SQL query language. The other half of the course will concentrate on the implementation of relational database management systems. Topics to be covered include file organizations, access methods (e.g., ISAM, B+ trees, linear and extendible hashing), external sorting techniques, the implementation of relational database operations, and the basic concepts of query optimization. Although this is a two-part course, the presentation of the two parts will be interleaved in order to spread the course's programming work out as smoothly as possible over the whole summer period.

Requisites

CS 367 is absolutely essential. You should know or be willing to learn quickly a high-level language such as Java, C++, Python, in order to do the project.

LEARNING OUTCOMES

Course Learning Outcomes

- Given a basic application that involves the use of database, students will be able to design databases, tables, relationships, queries, forms, grant access, SQL statements.
- Given a physical database, students will be able to develop methods to index, sort or optimize queries.

TENTATIVE SCHEDULE

Week	DATE	Topics/Reading	HW/ Project/Exams
Week 1	6/8/2020	Introduction to the course, relational database, ER model (Chapters 1,2)	Homework 1, due 6/14/2020
	6/10/2020	Relational Model and Translating ER into Relational (Chapter 3)	
	6/15/2020	Normalization (part 1)	

Week 2		(Chapter 15: 15.1-15.4	Project checkpoint 1, due 6/21/2020 Homework 2, due 6/21/2020
	6/17/2020	Normalization (part 2) (Chapter 15: 15.5-15.7)	
Week 3	6/22/2020	Relational Algebra and SQL (part 1) (Chapter 4: 4.1, 4.2) (Chapter 5: 5.1-5.2)	Project checkpoint 2, due 6/28/2020
	6/24/2020	SQL (part 2) (Chapter 5:5.3-5.6	
Week 4	6/29/2020	SQL (part 3) and Database Programming (Chapter 5: 5.8)	Midterm 7/1/2020 Lab, due 7/5/2020
	7/1/2020	Data Storage and Buffer Management (Chapter 7,8)	
Week 5	7/6/2020	Indexing B+ tree (Chapter 9)	Homework 3, due 7/12/2020
	7/8/2020	Indexing Hash (Chapter 10)	
Week 6	7/13/2020	External sorting (Chapter 11)	Project checkpoint 3, due 7/15/2020 Project checkpoint 4, due 7/19/2020
	7/15/2020	Relational operators (part 1) (Chapter 12:12.1-12.3)	
Week 7	7/20/2020	Relational operators (part 2) (Chapter 12: 12.4-12.5	
	7/22/2020	Query performance (part 1) (Chapter 13)	
Week 8	7/27/2020	Query performance (part 2) (Chapter 14)	Final project presentation starts on 7/23,7/24 7/27,7/28
	7/29/2020	Final exam	

GRADING

GRADABLE	Percentages
Lab, HWs	10%
Midterm Exam	25%
1 Big Project	35%
Final Exam	30%
Total	**100%**

Letter Grade	Percentage
A	**93% to 100%**
AB	**87% to 92%**
B	**80% to 86%**
BC	**77% to 79 %**
C	**70 % to 76%**
D	**60% to 69%**
F	**< 60%**

REQUIRED TEXTBOOK, SOFTWARE & OTHER COURSE MATERIALS

R. Ramakrishnan and J. Gehrke , Database Management Systems, 3rd ed. , McGraw-Hill, 2003. ISBN-10: 0072465638.

I will be using Mysql server to demonstrate SQL. But if you are using something else, please feel free to install and set it up yourself.

EXAMS, PROJECT

Homework and Lab: are designed in a way to help you understand and follow the topics of the lectures. The lab and HWs will be 10% off for every day that is late and no lab or homework is accepted after 1 week. Lab and HWs will be submitted through Canvas by the specific due dates

Final project is group work and individual contributor will be evaluated through team assessment. Please refer to the Project description for more details. We have five checkpoints for the final project. These checkpoints will be 10% for every day that are late. Instructor will NOT accept any late submission for the final project because of the time required to grade a project in this class and the time constraints reinforced by the school to submit the final grade.

Exams: we have a midterm (75 minutes) and final (2 hours). Instructor will give a window from 6am to 11:59pm on the day of the exam for students to start the exam. Once the exam is started, students will have 75 minutes for midterm and 2 hours for final exam.

ACADEMIC INTEGRITY

By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison's community of scholars in which everyone's academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. This includes but is not limited to failure on the assignment/course, disciplinary probation, or suspension. Substantial or repeated cases of misconduct will be forwarded to the Office of Student Conduct & Community Standards for additional review. For more information, refer to studentconduct.wiscweb.wisc.edu/academic-integrity/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

McBurney Disability Resource Center syllabus statement: "The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA." http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php

DIVERSITY & INCLUSION

Institutional statement on diversity: "Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world." https://diversity.wisc.edu/