BZAN 6356: Database Management Tools for Business Analytics
University of Houston
Fall 2020
Revision 2020.08.29

Instructor: Dr. Mark Grimes
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Melcher 280D

Textbooks:
Seven Databases in Seven Weeks (Second Edition)
Authors: Perkins, Redmond, and Wilson
ISBN: 978-1680502534

Next Generation Databases
Author: Guy Harrison
ISBN: 978-1484213308

Time: Monday 6:00 PM – 9:00 PM

Location: Online, via these services:

- **Zoom:** https://uofh.zoom.us/j/96921087513
  Meeting ID: 969 2108 7513
- **YouTube:** http://bit.ly/ProfessorMG
- **Blackboard:** https://elearning.uh.edu

Office Hours: By Appointment (Virtual)

Course Description

In this class we will cover seven database management systems representing the five dominant database genres: Relational, Columnar, Document, Graph, and Key-Value. These technologies are rapidly changing and many business analytics jobs will call for knowledge of multiple types of databases and data management paradigms. To this end, the goal is not to become an expert in any one of these databases, but rather to gain familiarity and hands-on experience that will allow you to identify when each type of database is appropriate and to adapt to any business needs you encounter.

These databases are naturally intertwined with cloud computing and other emerging technologies. Thus, we will also be discussing some cloud computing topics as well as general evolution of computing and data management to provide context as to how and why these systems are used.

This class is "synchronous online" for Fall 2020 and also uses a "flipped" classroom approach—that is, the core lecture material is provided in asynchronous online videos (YouTube) that you should watch before our normally scheduled class time. During our synchronous class time we will typically have a short lecture followed by labs, discussion, or presentations.

Learning Objectives

For each of the five types of databases we discuss in this course, you should be able to:

1. Describe the core principles, concepts, and applications of each DBMS
2. Match each type of DBMS to a business problem, discussing the pros and cons of using each type of database for a particular case
3. Be able to connect, import data, and run queries in each DBMS
4. Describe cloud computing concepts related to these types of systems

Grading

The goal of this class is to develop skills that will be useful for your career in data analytics. To this end, all of the course assessments are designed to help you develop and demonstrate mastery of these skills.

40% Lab Assignments Four @ 10% each	During the semester we will often have in-class lab exercises demonstrating how to use each type of DBMS. Five lab assignments will extend the work we do in class and are due by the time the next class period starts. Your lowest of the five lab assignment grades will be dropped. Unless otherwise stated, lab assignments can be completed individually or in small groups (2-4 students). If completed in a group, only one student should submit the assignment, but the submission must include the PSID, first name, and last name (as it appears in blackboard) of each group member.
40% Case Reports Two @ 20% each	Twice during the semester you will work with a group of 3-4 students to prepare a case report and presentation on a provided data management topic or case. Group assignments and details of the requirements for the report and presentation will be provided in mid-September.
20% Final Exam	A final exam will be administered during the designated final exam period.

Grade Allocations: **A:** 90-100% **B:** 80-89% **C:** 70-79% **D:** 60-69% **F:** < 60%

Schedule

As of August 18, 2020 - Schedule is subject to change!

I will try to keep changes minimal, but in particular additional readings will likely be added for classes 4 and beyond.

Date	Topic	Notes
1: 8/24	Introduction: Evolution of databases	**Before class:** • Read Perkins Ch 1 (pp. 1-8) • Read Perkins Appendix 2 (pp. 315-318) • Read Harrison Ch 1 – 3 (pp. 3-51) **During class:** • Introduction Lecture **After class:** • --

2: 8/31	Relational databases revisited: PostgreSQL	**Before class:** • Read Perkins Ch 2 (pp. 9-52) • Watch videos 2.0 – 2.3 • **Optional:** Postgres install using RDS **During class:** • Mini Lecture • PostgreSQL lab **After class:** • **LA1: PostgreSQL Lab Assignment**
3: 9/7	Labor Day – No Class	
4: 9/14	Column Family Databases: HBase Part 1	**Before class:** • Watch Videos 4.0 – 4.3 • Read Perkins Ch 3 (pp. 53-91) • Read Harrison Ch 8 (105-126) • **Optional:** Install HBase using EMR **During class:** • Mini Lecture • Breakout groups **After class:** • --
5: 9/21	Column Family Databases: HBase Part 2	**Before class:** • Watch videos 5.0 – 5.3 **During class:** • Mini Lecture • HBase Lab **After class:** • **LA2: HBase Lab Assignment**
6: 9/28	Document Databases: MongoDB Part 1	**Before class:** • Read Harrison Ch 4 (pp. 53-64) • Read Perkins Ch 4 (pp. 93 – 133) • Watch videos 6.0 – 6.x • **Optional:** MongoDB install using EC2 **During class:** • Mini Lecture • Breakout groups **After class:** • --

7: 10/5	Document Databases: MongoDB Part 2	**Before class:** • Watch videos **During class:** • Mini Lecture • MongoDB Lab **After class:** • **LA3: MongoDB Lab Assignment**
8: 10/12	Document Databases: CouchDB	**Before class:** • Read Perkins Ch 5 (pp. 136-175) • Watch videos • **Optional:** CouchDB installation **During class:** • Mini Lecture • CouchDB Demo **After class:** • --
9: 10/19	**Case presentations** **Relational, Columnar, and Document databases**	**Before class:** • **No Videos this week!** **During class:** • Case Presentations **After class:** • --
10: 10/26	Graph Databases: Neo4j Part 1	**Before class:** • Read Perkins Ch 6 (pp. 178-209) • Read Harrison Ch 5 (pp. 65-74) • Watch videos • **Optional:** Neo4j install using EC2 **During class:** • Mini Lecture • Breakout groups **After class:** • --
11: 11/2	Graph Databases: Neo4j Part 2	**Before class:** • Watch videos **During class:** • Mini Lecture • Neo4j Lab **After class:** • **LA4: Neo4j Lab Assignment**

12: 11/9	Key-Value Databases: DynamoDB	**Before class:** • Read Perkins Ch 7 (211-257) • Watch videos • **Optional:** DynamoDB Configuration **During class:** • Mini Lecture • Breakout groups **After class:** • --
13: 11/16	Key-Value Databases: Redis	**Before class:** • Read Perkins Ch 8 (pp. 259-304) • Read Harrison Ch 7 (pp. 88-102) • Watch videos • **Optional:** Redis config using Elasticache **During class:** • Mini Lecture • KV Lab **After class:** • **LA5: KV Lab Assignment**
14: 11/23	Wrap up	**Before class:** • Read Harrison Ch 12 (pp. 191-216) • Read Perkins Ch 9 (pp 305-310) • Watch videos **During class:** • Mini Lecture • Breakout groups **After class:** • --
15: 11/30	**Case Presentations** **NRDBMS Capstone**	**Before class:** • **No Videos this week!** **During class:** • Case Presentations **After class:** • --
12/11 5-8 PM	**Final exam during exam period**	

Other Important Details

(Virtual) Classroom Behavior

This semester is going to present a number of challenges and opportunities in our virtual classroom.

We are all in this together!

In order to have a successful online class, I ask the following:

1. Keep up with the reading and videos
2. Join the virtual class on time
3. Keep your microphone muted unless speaking
4. Occasionally we may want to have bi-directional video, thus you should wear school-appropriate attire and be in a learning-appropriate environment during class time
5. Be open to trying new ways of doing class including message boards, breakout rooms, and different types of videos/software/etc.

Syllabus Changes

Due to the changing nature of the COVID-19 pandemic, please note that the instructor may need to make modifications to the course syllabus and may do so at any time. Notice of such changes will be announced as quickly as possible through Blackboard.

Late Work

Assignments turned in late will be penalized 10% per calendar day for a maximum of five days, after which no credit will be given. Technology failure is not an excuse for late work, so do not wait until the last minute!

Excused Absence Policy

Regular class attendance, participation, and engagement in coursework are important contributors to student success. Absences may be excused as provided in the University of Houston Undergraduate Excused Absence Policy and Graduate Excused Absence Policy for reasons including: medical illness of student or close relative, death of a close family member, legal or government proceeding that a student is obligated to attend, recognized professional and educational activities where the student is presenting, and University-sponsored activity or athletic competition. Additional policies address absences related to military service, religious holy days, pregnancy and related conditions, and disability.

Recording of Class

Students may not record all or part of class, livestream all or part of class, or make/distribute screen captures, without advanced written consent of the instructor. If you have or think you may have a disability such that you need to record class-related activities, please contact the Center for Students with DisABILITIES. If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Classes may be recorded by the instructor. Students may use instructor's recordings for their own studying and notetaking. Instructor's recordings are not authorized to be shared with *anyone* without the prior written approval of the instructor. Failure to comply with requirements regarding recordings will result in a disciplinary referral to the Dean of Students Office and may result in disciplinary action.

Note from Prof. Grimes: I am required to include this language in the syllabus. Know that I will provide to you the slides used for class (both the live lectures and asynchronous presentations) and I will post recordings of both our live classes and asynchronous lecture content. While there should be very little reason to create screenshots or videos of your own, I am fine with taking an occasional screenshot for your own notes/personal use. However, in keeping with the language provided by the university, do not distribute screenshots, videos, or slides outside of the platform via which they have been shared with you (i.e., I am fine with you sending someone a link to my YouTube video, but please do not make a copy of my YouTube video and post it on your own channel!).

UH Email

Email communications related to this course will be sent to your Exchange email account which each University of Houston student receives. The Exchange mail server can be accessed via Outlook, which provides a single location for organizing and managing day-to-day information, from email and calendars to contacts and task lists. Exchange email accounts can be accessed by logging into Office 365 with your Cougarnet credentials or through Acccess UH. They can also be configured on IOS and Android mobile devices. Additional assistance can be found at the Get Help page.

Honor Code Statement

Don't cheat. Cheating in the workplace can cost you your job, and cheating in this class will cost you your grade (and sanctions from the dean of students). Cheating includes any action where you take credit for work on any assignment or exam that you did not do yourself. Likewise, if you allow another student to copy your work, you are complicit in cheating and equally guilty. **Plagiarism is cheating!** If you include any material obtained elsewhere in your assignment, you must reference the original work. Plagiarism is not just when you "copy and paste", but is also when you take ideas from another place without referencing the original source. If in doubt, cite your source.

Students may be asked to sign an honor code statement as part of their submission of any graded work including but not limited to projects, quizzes, and exams: "*I understand and agree to abide by the provisions in the (select: University of Houston Undergraduate Academic Honesty Policy, University of Houston Graduate Academic Honesty Policy). I understand that academic honesty is taken very seriously and, in the cases of violations, penalties may include suspension or expulsion from the University of Houston."*

Helpful Information

COVID-19 Updates: https://uh.edu/covid-19/

Coogs Care: https://www.uh.edu/dsaes/coogscare/

Laptop Checkout Requests: https://www.uh.edu/infotech/about/planning/off-campus/index.php#do-you-need-a-laptop

Health FAQs: https://uh.edu/covid-19/faq/health-wellness-prevention-faqs/

Student Health Center: https://uh.edu/class/english/lcc/current-students/student-health-center/index.php

GOOD LUCK!