Syllabus: University of Wyoming Computer Science 4280 Database

Spring 2021

- Instructor: Prof. Philip Schlump
- Office: Office hours will be online using Zoom. M,W,F from 8:00am to 9:00am and by appointment. The Zoom link to join will be emailed out to the class.
- Contact via email (pschlump@uwyo.edu) or (for emergencies only): 720-209-7888 (my cell) and pschlump@gmail.com (personal email).
- Class Time: Lectures are online and pre-recorded.

If you call me to set up an appointment, you will need to send me a SMS message first so that I enter your name into my contact list. I get 10+ robo-calls a day and I will not answer a random number. Text me with your name and that you are a student in 4280 class.

Overview

Database is one of the code technologies behind most applications. That makes this a very important class.

The class will have a set of pre-recorded lectures. These are available for both download and from YouTube.

There will be a set of Interactive Homework. Each of these has a sort video, text and an interactive box for doing the work. The first 2 videos are critical as they show how to use the tool and how to get your grade for these assignments.

There are 5 Interactive discussions. These are required. They will be on zoom. Choose a time of day to attend. They will be held at 3 different times a day - so you only need to attend one of the 3 on that a day. Each of the synchronous zoom discussions will be at 9:00am, 3:00pm and 6:00pm on a Monday. If you are unable to make one of the times let me know and I will find a time. These will be about 45 minutes long.

There will be 8 assignments. The number of points varies. Assignment 3 and 4 are a single project broken into 2 parts. You have to complete 3 to do 4.

There will be a midterm and a final. They will be online.

Lectures

Lecture	Week	Date
1. Syllabus -- Class Requirements	1	Jan 21
- Interactive Homework	1	Jan 21
- Assignments		
- Interactive Discussions (zoom)		
- Tests		
2. Why Database	2	Jan 25
3. Installing PostgreSQL and other tools (Assignment 1)	2	Jan 25
- PostgreSQL		
- Python		
- bottle		
- python libraries		
- JavaScript (jQuery)		
- style sheets and fonts (Bootstrap)		
4. My Database Background	3	Feb 1
5. How applications work today	3	Feb 1
6. Future of Database	4	Feb 7
7. Global Variables Considered Harmful	4	Feb 7
8. Jobs In Database	5	Feb 14
9. ERD and Modeling	5	Feb 14
10. Data Modeling (Entity Relationship Model)	6	Feb 21
11. ACID compliance and history of database	6	Feb 21

Lecture	Week	Date
12. The Rise of NoSQL - MongoDB (MongoDB v.s. PostgreSQL JSONb data type)	7	Feb 28
13. F1 a world scale database	7	Feb 28
14. Midterm Review	8	Mar 1
15. Practical NoSQL - Redis	8	Mar 1
16. Hash Based Databases v.s. SqLite	9	Mar 7
17. Scaling SQL	9	Mar 7
18. Testing with Database	10	Mar 14
19. Blockchain as a Database	10	Mar 14
20. Data Growth	11	Mar 21
21. PostGIS - Geographic Information System	11	Mar 21
22. MongoDB / NoSQL	12	Mar 28
23. PostGIS - Geographic Information System	12	Mar 28
24. Column stores like Cassandra	13	Apr 5
25. Time-series databases, InfluxDB	14	Apr 12
26. Timescale - the PosgreSQL Time Series Database	14	Apr 12
26. Performance Tuning SQL (1)	15	Apr 19
27. Performance Tuning SQL (2)	15	Apr 19
28. Conclusions / Final Review	16	Apr 26

Class Interactive Discussions

1. Application Supply Chain - Feb 15
2. Security - Feb 22
3. Backup and the Law - Mar 8
4. Future of Database - Mar 15
5. SQL or NoSQL - Mar 29

Interactive Homework

The interactive tool is at https://easy-2c-why.com/ . You should have received and email with this location and your login and password to tool. The Interactive is 255 of your semester grade. The tool is not tied directly to the UW Canvas system so I will have a "Interactive Homework" assignment that is the cumulative number of points for this set of work.

Homework on your computer

You will need to install and use a number of database tools on your computer. If you are using a Microsoft Surface that is not x86 based this may be difficult to impossible to do. In that case get a free AWS EC3 instance or a $5.00 a month Linode and load the database and other tools on that and run them remotely.

Grading

Points	Percentage	Grade
2000…1800	100% to 90%	A
1800…1600	90% to 80%	B
1600…1400	80% to 70%	C
1400…1200	70% to 60%	D
1200…0	below 60%	F

Assignments.

1000pts total.

Assignments	Pts	Description	Due Date	Duration
01 - Install	50	Install PosgreSQL, Redis, Python, pgAdmin	2021-02-15	2 weeks

Assignments	Pts	Description	Due Date	Duration
02 - Insert	200	Parse text / generate data	2021-03-01	2 weeks
03 - Keyword	200	Key World Search	2021-03-22	2 weeks
04 - App	300	Issue Tracking Application	2021-03-29	3 weeks
05 - Data dump	50	Use pgdump to dump data	2021-04-05	1 weeks
06 - Backup	50	Use tar to backup entire database	2021-04-12	1 weeks
07 - Remote	50	Setup database security	2021-04-26	1 weeks
08 - Tune SQL	100	Find and Tune SQL	2021-05-07	1+ weeks
Total	1000			11 weeks

1000 pts - Assignments 500 pts - Interactive Homework 500 pts - 2 tests (midterm, final) Midterm Date: 2021-03-10 Final Date: 2021-05-11

2000 pts - total

50 Interactive (10pts each) 10 per week = 4 weeks (>>

iHW Num.	Due Date
01 .. 09	2021-02-01
10 .. 19	2021-02-08
20 .. 29	2021-02-15
30 .. 39	2021-02-22
40 .. 50	2021-03-08

Tests (Midterm, Final)

2 tests each worth 250 points.

Midterm will be due on March 19. You will have about a week to do it. It will be online.

Final will available on May 6th and due on the last day of finals, May 14.

Tools

PostgreSQL:

PgAdmin:

Redis:

Python 3.8 - Anaconda: https://www.anaconda.com/products/individual

Extra credit

No extra credit is planned at this time.

Required texts

The interactive homework lists sections of the book. The textbook book is required.

Office Hours

Online: Office hours are online - you can make an appointment but I will be online in Zoom Monday, Wednesday, Friday from 8:00am till 9:00am. Additional office hours will be announced.

Late work.

Generally it is a good idea to get the homework done on time. Normally I take 10% off for each week day that a homework is late until it is worth only 40% of the original points. The last day for turning in homework is Dec 12.

Original work policy (in this class).

Homework is turned in online via file upload. The homework is really, really important. Do your own work. That is how you learn. If you use google or other web sources, then note where you got the code or answer from. If you copy from the web, then expect that on a one-on-one basis I will be asking you how the code works. Help each other. It is legitimate in this class, (it may not be in other classes), for you to help your fellow student. If you do then note it in your code. Code is very unique to each person. If two of you turn in the same code - that is very bad. If you note that you worked on it together - and then I ask each of you to explain how it works - that's alright. If you have questions about this email me.

Title IX – Duty to Report

The University of Wyoming faculty are committed to helping create a safe learning environment for all students and for the university as a whole. If you have experienced any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking, know that help and support are available. The University has staff members trained to support survivors in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The University strongly encourages all students to report any such incidents to the University. Please be aware that all University of Wyoming employees, including student staff, are required to report all Title IX related concerns to the Title IX Coordinator or their supervisor. This means that if you tell a faculty member about a situation of sexual harassment or sexual violence, or other related misconduct, the faculty member must share that information with the University's Title IX Coordinator. UW's Title IX Coordinator is Jim Osborn (Manager of Investigations, Equal Opportunity Report and Response). He is located in Room 320 of the Bureau of Mines Building, and can be reached via email at report-it@uwyo.edu or via phone at 766-5200 or 766-5228. For more information, go to: http://www.uwyo.edu/reportit/learn-more/faqs.html .

Attendance and Absence policies

You have to watch the lectures. This class has prerecorded lectures that you are expected to watch/listen to. This is your "required" attendance.

SARS-Cov-2 / COVID-19 Related Policies

During this pandemic, you must abide by all UW policies and public health rules put forward by the City of Laramie (or by Natrona County if at UW-Casper), the University of Wyoming and the State of Wyoming to promote the health and well-being of fellow students and your own personal self-care. Please review our current policy. As with other disruptive behaviors, we have the right to dismiss you from the classroom (Zoom and physical), or other class activities if you fail to abide by these COVID-19 policies. These behaviors will be referred to the Dean of Students Office using the UWYO Cares Reporting Form for Student Code of Conduct processes.

Syllabus Changes

I will alert you to any possible course format changes in response to UW decisions about community safety during the semester.

Classroom Behavior Policy

(This section is not really applicable to this class - we will have class discussions that this applies to)

At all times, treat your presence in the classroom and your enrollment in this course as you would a job. Act professionally, arrive on time, pay attention, complete your work in a timely and professional manner. You will be respectful towards your classmates and instructor. Spirited debate and disagreement are to be expected in any classroom and all views will be heard fully, but at all times we will behave civilly and with respect towards one another. Personal attacks, offensive language, name-calling, and dismissive gestures are not warranted in a learning atmosphere. As the instructor, I have the right to dismiss you from the classroom.

Classroom Statement on Diversity

The University of Wyoming values an educational environment that is diverse, equitable, and inclusive. The diversity that students and faculty bring to class, including age, country of origin, culture, disability, economic class, ethnicity, gender identity, immigration status, linguistic, political affiliation, race, religion, sexual orientation, veteran status, worldview, and other social and cultural diversity is valued, respected, and considered a resource for learning.

Disability Support

If you have a physical, learning, sensory or psychological disability and require accommodations, please register as soon as possible and provide documentation of your disability to Disability Support Services (DSS), Room 109 Knight Hall. You may also contact DSS at (307) 766-3073 or udss@uwyo.edu. Visit their website for more information: www.uwyo.edu/udss

Academic Dishonesty Policies

Don't cheat on the exams. I expect you to take full advantage of all the online resources you can get your hands on. That includes Stack Overflow, Github etc. If you do use someone else's code, put in a link to where you found it. Don't cheat on the projects - do you own work. Most of the learning in the class is from *doing* the projects.

Substantive changes to syllabus

All deadlines, requirements, and course structure are subject to change if deemed necessary by the instructor. Students will be notified verbally in class, on our WyoCourses page announcement, and via email of these changes. I do travel during the semester. Class could be canceled or assignments due dates changed.

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