

Syllabus: University of Wyoming Computer Science 4820 Database

Spring 2022

- Instructor: Prof. Philip Schlump
- Office: 4081B in the Engineering Building. My office is right across the hall from the Computer Science Department Office.
- Office: Office hours will be Tu/Th from 9:25am to 10:50am (immediately following this class) and by appointment.
- Contact via email (pschlump@uwyo.edu) or (for emergencies only): 720-209-7888 (my cell) and pschlump@gmail.com (personal email).
- Class Time: 08:10 AM - 09:25 AM Building: Agriculture Bldg Room: 1032

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 4820 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 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.

Date	Lect. No	Description
<i>Week 1</i>		
Tue Jan 18	1	Cover Syllabus - Class Rules
		Interactive Homework.
		Full Stack / Using Database.
		Why Database Science.
Thr Jan 20	2	Installing PostgreSQL.
		System Admin.
		Install Python - Anaconda.
		Install using 'pip'.
<i>Week 2</i>		
Tue Jan 25	3	Tables and Types
Thr Jan 27	4	Multiple Tables and basic queries
<i>Week 3</i>		
Tue Feb 01	5	Inserting data
Thr Feb 03	6	Updating Data
<i>Week 4</i>		
Tue Feb 08	7	Deleting Data
Tue Feb 10	8	Indexing - finding data faster.
<i>Week 5</i>		
Tue Feb 15	9	Key Word Search.
Thr Feb 17		NO CLASS (There may be a recorded video)
<i>Week 6</i>		
Tue Feb 22	10	Alter data models.
Thr Feb 24	11	Foreign Keys.
<i>Week 7</i>		
Tue Mar 01	12	Midterm Review.
Thr Mar 03	13	Midterm Test

Date	Lect. No	Description
Week 8		
Tue Mar 08	14	Python and bottle.
Thr Mar 10	15	How applications work.
Mar-10		Spring Break - No Class
to Mar-18		
Week 9	16	Basic database application.
		Most applications are use database.
Thr Mar 24	17	Jobs in Database
Week 10	18	
Tue Mar 29		Design Database with Entity Relationship Models (ERD)
Thr Mar 31	19	Future of Database (F1, etc)
Week 11	20	
Tue Apr 05		ACID Compliance and MongoDB
		(FerriDB, Pg and JSONb data)
Thr Apr 07	21	Security / Database
Week 12	22	
Tue Apr 12		NO-SQL Redis
Thr Apr 14	23	Database Scale
Week 13	24	
Tue Apr 19		Legal and Backup
Thr Apr 21	25	Hash Based Database
Week 14	27	Blockchain is not a Database.
Tue Apr 26		
Thr Apr 28	28	Performance Tuning SQL
Week 15	29	
Tue May 03		More on Performance.

Date	Lect. No	Description
Thr May 05	30	Final Review.

Some fill in topics that will be covered when a lecture is too short.

1. Global Variables Considered Harmful
2. History of Database
3. Trends in Database
4. PostGIS

Textbook

Practical SQL: A Beginner's Guide to Storytelling with Data, by by Anthony DeBarros .

Interactive Homework

The interactive tool is at <https://easy-2c-why.com/> . You should have received an email with this location and your login and password to tool. The Interactive is 25% 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
2300...2070	100% to 90%	A
2069...1840	90% to 80%	B
1839...1610	80% to 70%	C
1609...1380	70% to 60%	D
1379...0	below 60%	F

Assignments.

1200pts total.

Assignments	Pts	Description	Due Date	Duration
01 - Install	200	Install PostgreSQL, Redis, Python, pgAdmin	2022-02-07	2 weeks
02 - Insert	200	Parse text / generate data	2022-02-28	2 weeks
03 - Keyword	200	Key Word Search	2022-03-14	2 weeks
04 - App	500	Issue Tracking Application	2022-04-11	4 weeks
05 - Data dump	50	Use pgdump to dump data	2022-04-21	1 weeks
06 - Backup	50	Use tar to backup entire database	2022-04-28	1 weeks
07 - Tune SQL	100	Find and Tune SQL	2022-05-07	1 weeks

Assignments	Pts	Description	Due Date	Duration
Total	1300			11 weeks

1300 pts - Assignments 500 pts - Interactive Homework 500 pts - 2 tests (midterm, final) Midterm Date: 2022-03-10 Final Date: 2022-05-11

2300 pts - total

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

iHW Num.	Due Date
01 .. 09	2022-02-01
10 .. 19	2022-02-08
20 .. 29	2022-02-15
30 .. 39	2022-02-22
40 .. 50	2022-03-08

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 may take 10% off for each week day that a homework is late until it is worth only 50% of the original points. The last day for turning in homework is May 7.

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 your 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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