Class: 1010 Intro Computer Science

Class Time

Lecture: Tu/Th 11:10 AM - 12:25 - Room 310 Class Room Building (CR)

Attendance is required.

Lab Times

Lab 10: Tu 3:20pm - 5:10pm - Enzi STEM Room 315

Lab 11: Tu 6:20pm - 8:10pm - Enzi STEM Room 315

Lab 12: Th 3:20pm - 5:10pm - Enzi STEM Room 315

Lab 13: Th 6:20pm - 8:10pm - Enzi STEM Room 315

Lab 14: Fr 2:30pm - 4:20pm - Enzi STEM Room 315

Attendance is required.

Final Time

Thursday the final will be December 16 10:15 a.m. – 12:15 p.m. In this room.

Instructor

- Prof Philip Schlump
- Office: Office hours will be Tuesday, Thrusday from 9:00am to 10:45am and by appointment. Appointments can include using zoom.com for remote office hours.
- Contact via email (pschlump@uwyo.edu) or (for emergencies only): 720-209-7888 (my personal cell) and pschlump@gmail.com (personal email). For using GIT and inviting me to have access to your files/projects use pschlump@uwyo.edu as the email address.
- Class Time: Turn off phones and other internet connected devices during class and lab.

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 1010 class.

Overview of the class

Python is becoming a more important language. In some analysis is is the most important language. Job sites show that Python is the most in-demand job. Python was designed to be easy to learn.

In this class we will cover the basics of programming, automated testing, source code control (git), and how to convert requirements into programs. Some time will be spent using a variety of tools that are common to most modern software development.

In the second half of the class we will focus on using TensorFlow 2.x. and Kereas a library on top of TensorFlow that makes the creation of data pipelines and machine learning relatively easy. A significant emphasis will also be on using Pandas and NumPy to engineer data so that it is suitable for use in a machine learning context. The experience with advanced data manipulation libraries like Pandas and NumPy is useful outside the area of Machine Learning.

Throughout the class we will be using a number of tools. Visual Studio Code will be used for editing text and other files. Python 3.8 will be the version of Python that we are working with. This is the Anaconda install version of Python. The exact version of Python is the Anaconda 64 bit release of Python. We will use TensorFlow 2.x. Realistically you should install these tools on on your own computer. They work on Mac, Windows, and Linux. I do 80% of my development on a Linux system, 15% on Mac and 5% on Windows. We will also use a tool called Jupyter Notebooks. This is a layer on top of Python.

Visual Studio Code: https://code.visualstudio.com/download

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

Iron Python and Jupyter Notebooks: https://jupyter.org/install

(You won't need this installed for a while, but...) TensorFlow 2.x: https://tensorflow-object-detection-api-tutorial.readthedocs.io/en/latest/install.html

Required texts

We will be covering the first 1/2 of the book in learning Python (pages 1 ... 318). The book can be purchased from Amazon if you need a paper copy. *Python Crash Course* by Eric Mathers, 2nd edition. At this point in time Amazon lists it for $17.00 and notes that it is the best selling Python book of all time. The Amazon link is: https://www.amazon.com/Python-Crash-Course-2nd-Edition/dp/1593279280/ref=pd_sim_14_7

There will be outside reading also. I will provide links or .pdfs.

Required Activity

You are expected/required to visit office hours at least once during the semester. Come with a question - any question. It need not be class related.

Homework is Required

Most of the class grade comes from the homework. Specifically 30% of the semester grade is from the midterm and the final. 15% from Midterm, 15% from Final. The final is cumulative.

Extra credit

No extra credit is planned at this time.

Class Dates and Schedule.

Note - This is the current "Plan" - if this is updated it will be announced in class and posted to the Github.com site for the class.

Date	Lect. No	Description
Week 1		
Tue Aug 24	1	Cover Syllabus - Class Rules Why Computer Science. Your first program (Excel/Google Sheet) Your first program - Python.
Thr Aug 26	2	Python Mental Model. Basic Operators. Variables / Types *Textbook Chapter 1*
Week 2		
Tue Aug 31	3	Code Re usability. def‘. Unit Conversions. Mikes to km. Big Numbers. Encryption. A Model of Solar System How computers represent data. *Textbook Chapter 2*
Thr Sep 2	4	Lists. Data Structures.

Date	Lect. No	Description
		Files, Modules. Input / Output in Python. Use of Command Line *Textbook Chapter 3*
Week 3		
Tue Sep 7	6	How important testing is. Testing Code Automated Testing Formal Verification *Textbook Chapter 11 - Testing*
Thr Sep 9	7	More on Lists, Dictionaries Maps. Very basic use of Git. *Textbook Chapter 4*
Week 4		
Tue Sep 14	8	Control Flow / If Statements *Textbook Chapter 5*
Tue Sep 16	9	Dictionaries Outside Data - SQLite3 Outside Data - Pandas *Textbook Chapter 6*
Week 5		
Tue Sep 21	10	Control Flow / Loops *Textbook Chapter 7 - Loops*
Thr Sep 23		NO CLASS - Wyoming Hack-A-Thon. Yes you still have lab(s). You should go and attend some of the Hack-A-Thon.
Week 6		
Tue Sep 28	11	String Processing. Representation. Searching Genetic Data. *Textbook Chapter 7 - User Input*
Tue Sep 30	12	Functions / Recursion

Date	Lect. No	Description
		Textbook Chapter 8
Week 7		
Tue Oct 5	13	Midterm Review.
Thr Oct 7	14	Midterm Test
Week 8		
Tue Oct 12	15	Object Oriented Programming. *Textbook Chapter 9*
Thr Oct 14	16	More on Objects. Objects and Testing. How the web works. A bit of HTML, CSS, JS. A bit of bottle.
Week 9 Tue Oct 19	17	Understanding data. Data Engineering. What is TensorFLow (TF) what is a Tensor.
Thr Oct 21	18	Example of Classification. Uses of ML in the real world.
Week 10 Tue Oct 26	19	Overfit and Underfit. Using Pandas and NumPy.
Thr Oct 28	20	Building a data Pipeline. Managing data. Image data. Test data. CSV files.
Week 11 Tue Nov 2	21	Limitations of Machine Learning. "You are a Thing and I Love You" Machine learning and social context. ML and the law.
Thr Nov 4	22	ML and future of work.

Date	Lect. No	Description
Week 12	23	Regression with TF.
Tue Nov 9		Predicting Housing Prices.
Thr Nov 11	24	Real world example of ML.
Week 13	25	Text Classification with TF Hub.
Tue Nov 16		Reuse of Models.
Thr Nov 18	26	ML and Privacy.
Nov 22-26	27	Thanksgiving Break.
Week 14	28	Sentiment Analysis.
Tue Nov 30		
Thr Dec 3	29	Computer Security / Authentication.
Week 15	30	Blockchain and economic impact.
Tue Dec 7		Future of Computing.
Thr Dec 9	31	Final Review.

Lab Schedule

This is the schedule for the lab.

Date	Week	Description
Week 1		
Aug 24, 26, 27	1	Installation of Python, Compeer Setup Hello World Program. Lab Goal: Be able to write a program.
Week 2		

Date	Week	Description
Aug 31, Sep 2, Sep 3	2	File System. Editing Text Files. Lab Goal: Be able to write a program. 1st part of Unit Conversion.
Week 3 Sep 7, 9, 10	3	Solar System Distances Lab. Lab Write and Test 2 Program(s). Get output of Test. Run Programs to answer Lab Questions. Creating text file (Markdown) for homework.
Week 4 Sep 14, 16, 17	4	CSV reading and a Dictionary
Week 5 Sep 21, 23, 24	5	SQLite3 Data Analysis Pull out data. Draw Graphs.
Week 6 Sep 28, 30, Oct 1	6	Search Genetic Data. Determine if person's genes have CF.
Week 7 Oct 5, 7, 8	7	Recursive Calculation Calculate Fibonacci Find the largest value in a list.
Week 8 Oct 12, 14, 15	8	A simple form with a web page and form. Render a page with a form. POST - save data to SQLite3.
Week 9 Oct 19, 21, 22	9	Tensor Flow Install - Hello World
Week 10 Oct 26, 28, 29	10	Data Analysis
Week 11 Nov 2, 4, 5	11	Image Classification

Date	Week	Description
Week 12 Nov 9, 11, 12	12	Hand Writing Analysis
Week 13 Nov 16, 18, 19	13	Sentiment Analysis Part 1.
Week 14 Nov 30, Dec 2,3	14	Sentiment Analysis Part 2. Compeer Security Worksheet.

Homework/Assignments

Assignment #	Date Due	Pts	Description
1	Mon Aug 30	100	Lab 1: Hello World in Python Due as a part of your lab.
2	Mon Sep 6	100	Assignment 1: Basic Unit Conversion
		100	Lab 3: Testing of Unit Conversion.
3	Mon Sep 13	100	Assignment 2: Distance to Planets (with test code)
		100	Lab 3: Planet/Star Distances questions Due. Due as a part of your lab.
4	Mon Sep 20	100	Sort and Search Data
		100	Lab 4: Setup and use git and a branch.
5	Mon Sep 27		xyzzy
		100	Lab 5: xyzzy xyzzy
6	Mon Oct 4		xyzzy
		100	Lab 6: xyzzy xyzzy
7	Mon Oct 11		xyzzy
		100	Lab 7: xyzzy
8	Mon Oct 18		xyzzy
		100	Lab 8: xyzzy
9	Mon Oct 26		xyzzy
		100	Lab 9: xyzzy
10	Mon Nov 1		xyzzy
		100	Lab 10: xyzzy
11	Mon Nov 8		xyzzy
		100	Lab 11: xyzzy
12	Mon Nov 15		xyzzy
		100	Lab 12: xyzzy
13	Mon Nov 29		xyzzy
		100	Lab 13: xyzzy
14	Mon Dec 6		xyzzy

Assignment #	Date Due	Pts	Description
		100	Lab 14: xyzzy
Total		2800	

Grading

Points	Percentage of Semester Grade	Description
1400	35%	Homework / Assignments
1400	35%	Labs
600	15%	Midterm
600	15%	Final

4000 points total for the semester.

Letter Grade	Point Range
A	4000 to 3600
B	3599 to 3200
C	3199 to 2800
D	2799 to 2400
F	2399 and below

Install

Tools

1. Anaconda Python
2. Iron Python (Jupyter Notebooks)
3. Visual Studio Code
4. GIT
5. VIM

Python Packages to Install

This is not a complete list but we will use all of the following Python Libraries. You should import all of these in your "Hello World" so that you verify that you have them installed.

1. pandas

2. numpy
3. bottle
4. SQLite3
5. tensorflow
6. keras
7. matplotlib

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 10 at Midnight. No homework will be accepted after this point.

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 comments 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 - thats alright. If you have questions about this email me. If you use code from the web then expect that I will be asking about what the copyright and license terms are for the code. Not all code that is published can be reused. Also be aware that I put hidden data flaws into assignments. For example the accurate size of a tennis ball is 2.575 inches. In previous years I have used 2.5, 2.6 and this year 2.75 inches. If you ask a previous year student for the answers and turn that in you will have wrong result. If you just copy from the web you will have a wrong result.

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 and listen to the podcast. This class has prerecorded lecture and audio 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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