

2022 Spring PIC 16B: Python with Applications II

Welcome to PIC 16B! Here's a bunch of stuff about the class that you may have questions about. But first, I want you to know that your number one priority should be your physical and mental health, not this nor any other class. Stay hydrated, sleep well, and try to enjoy your time at UCLA. Let me know if you need an extension for any assignment.

Lectures: MWF 2-2:50 pm MS 5127

Discussions: TR 2-2:50pm MS 5127

Instructor: Harlin Lee. Please call me "Harlin". You can email me at harlin@math.ucla.edu or DM me at Campuswire.

Open-door office hours: On Mondays 3-4pm and Wednesdays 3-4pm, the door to my office (MS 7360) will stay open. You are encouraged to drop by and ask questions about the homework, coding projects (PIC or personal), or just share feelings about the class.

One-on-one meetings: I am happy to schedule a closed-door office meeting or private zoom meeting if you want to talk about your performance in this class, grad school applications, career plans, or whatever feelings you have about the world.

I am here to listen to whatever you have to share, but if you disclose any incidents of sexual harassment or sexual violence, I am required by UCLA to report them to the Title IX Coordinator. If you would like to maintain confidentiality, you should talk to CaPS <https://counseling.ucla.edu/about-us/confidentiality> or CARE <https://careprogram.ucla.edu/>.

TAs and Office hours:

Shruti Mohanty (shrutimohanty@g.ucla.edu), Office hours: R 3-4pm MS 6118, F 11am-12pm zoom

Textbooks: None. When debugging, check the error messages -> official documentation → Stack Overflow → other resources in Google.

Official documentation: <https://docs.python.org/3/library/index.html>

Official tutorial: <https://docs.python.org/3/tutorial/index.html>

Course websites

- All class materials will be uploaded to Canvas <https://bruinlearn.ucla.edu/courses/129850>
- All student questions should be posted at Campuswire <https://campuswire.com/c/GA06C3804/feed>
- All assignments will be uploaded to and graded in Gradescope <https://www.gradescope.com/courses/369934>

Waitlist policy

PIC doesn't use PTEs. Please see <https://ww3.math.ucla.edu/enrollment-into-math-and-programming-in-computing-pic-courses/>. If you're on the waitlist, you can expect to be enrolled after the waitlist period is over.

Official Math department description of PIC 16B:

Lecture, three hours; discussion, two hours. Prerequisite: course 16A or equivalent. In-depth application of Python programming language to problems arising in variety of areas of current interest such as machine learning, computer vision, statistical analysis, numerical analysis, and data acquisition. Advanced Python programming techniques to improve computational efficiency. P/NP or letter grading.

... and course objectives:

Students will create complex Python programs to solve problems of interest in science and industry. Students will effectively deploy a range of Python packages to approach specialized tasks, and develop intuitive understandings of how these packages operate. Students will analyze and revise Python programs to improve clarity, robustness, and performance.

Upon completion of this course, students will be able to write, analyze, and communicate about Python programs that accomplish a variety of complex computational tasks, including at least four of the following:

- Acquiring data sets via databases or web-scrapers.
- Analyzing data using complex manipulation and visualizations.
- Constructing complex machine learning pipelines for structured, image, and text data sets.
- Solving problems in computational mathematics, including systems of linear equations, eigenvalue problems and singular value decomposition, optimization, differential equations, and simulations.
- Enhancing program performance using multithreading.
- Deploying functional webpages using a Python-based web development framework.
- Constructing complex, robust, documented Python modules suitable for public dissemination and deployment.

Additionally, students will be able to identify and install Python modules to achieve a wider variety of tasks than those directly covered in the course.

Topics

- Advanced Python programming: multiple inheritance, decorators and wrappers, itertools, functools, multi-threading and multi-processing, setuptools.

- Programming skills: version control with Git, understanding Python package structure, understanding Python dependencies, debugging, commenting, reading and writing documentation, code reproducibility, computing and ethics
- Applications and packages:
 - Web scraping
 - Web development with Flask
 - Deep learning with keras
 - SQL Database interaction
 - (maybe) Image processing and computer vision with openCV
 - (maybe) Graphic user interface with PyQt

Grading scheme

This class has **6 assignments** and a **group project**.

- A+: Earn credit for 6 assignments + outstanding project and participation
- A: Earn credit for 5 assignments + project
- A-: Earn credit for 4.5 assignments + project
- B+: Earn credit for 4 assignments + project
- B: Earn credit for 3 assignments + project

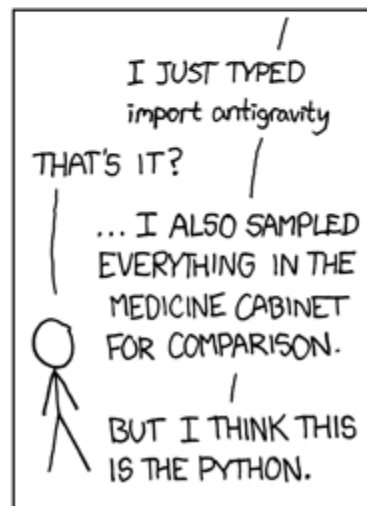
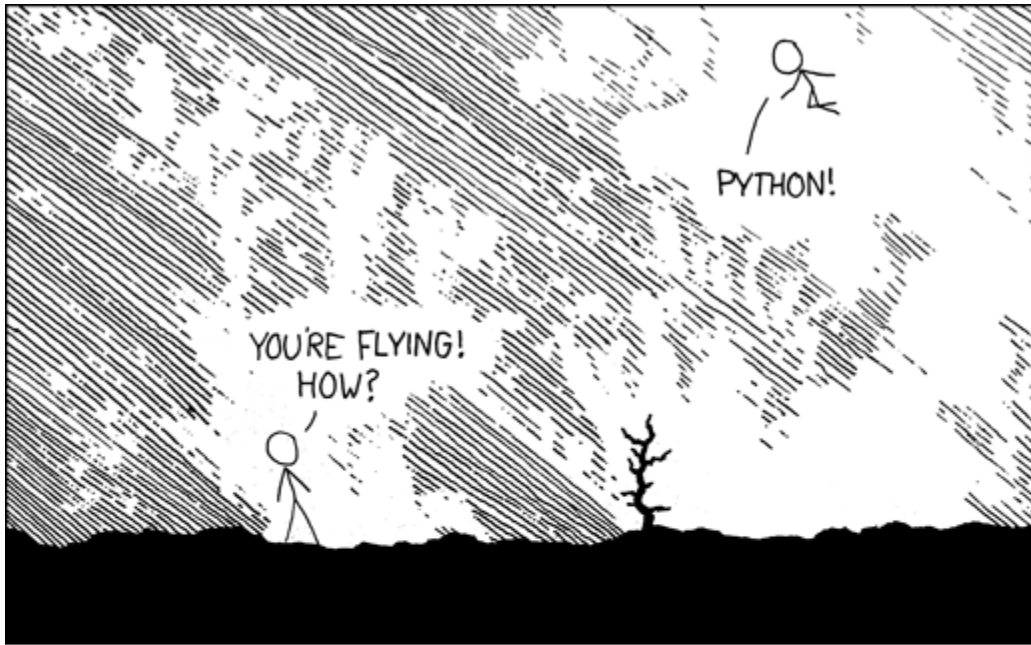
All of these assignments and project will be graded on completion, meaning that you will earn full credit as long as you meet a set of “specs”. You’ll have opportunities to resubmit your work if you want to. But please note that you need to get credit for *all* project assignments in order to get a grade above C in this class.

Lecture recordings

After each lecture, I will upload a recording of the lecture, along with any material that was used to teach that day (live coding Jupyter notebooks, slides, links to videos, etc). However, I will *not* stream my lecture live on zoom because it’s too hard to keep track of both in-person questions and the zoom chat at the same time. If you are watching the recorded video later and have any questions, I’m happy to answer on Campuswire.

Discussion recordings

For the first two weeks, the TA will record and upload all recordings of the discussions. After two weeks, it’s up to the discretion of the TA.



<https://xkcd.com/353/>