**Tools For Analytics**

Date and Time:

* <https://vergil.registrar.columbia.edu/#/courses/Tools%20for%20Analytics>

Instructor:

* Paul Logston <paul.logston@columbia.edu>
  + Office Hours: Wednesdays, 3-4p, Mudd 318

CAs:

* TBA
  + Office Hours: TBA

**Description**

The goal of this course is to introduce students to the basics of programming in Python and the tools within the programmer's ecosystem. By the end of the course, students will have a working knowledge of Python and the tools within its numerical computing ecosystem.

**Rough Topic Schedule - Weeks & Topics**

* Week 0: Python Basics, Type Annotations, File Access
* Week 1: Exceptions, Recursion, Generators
* Week 2: Linux, CLI tools, Vim
* Week 3: Git, GitHub, SSH
* Week 4: Databases (Relational), Indexes, Normalization
* Week 5: SQL
* Week 6: OOP
* Week 7: OOP and Big-O
* Week 8: Data Structures, Big-O, Algorithms
* Week 9: Regex
* Week 10: Web, Django - Basics
* Week 11: Django with data (ORM)
* Week 12: Django with JS, CSS, Frontend
* Week 13: Serialization, HTML, JSON, CSV, Requests

**Prerequisites**

There are no course prerequisites for this class. However, students should watch the following videos.

[Python101 - Chapter 1](https://cvn.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=053985ae-d6c9-41ae-bce1-a2b8ac515d21)

[Python101 - Chapter 2](https://cvn.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=0286dcd5-1686-4284-a495-5ca5a6997a36)

[Python201 - Chapter 1 (Basics)](https://cvn.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=ceba4ac4-98e4-4460-b88d-a90a01168510)

[Python201 - Chapter 2 (Type)](https://cvn.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=32a9921b-e4bc-425e-a3f5-a90a01168530)

[Python201 - Chapter 3 (Strings)](https://cvn.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=09cd4674-c76d-4b7d-ae7f-a90a01168565)

[Python201 - Chapter 4 (Bytes)](https://cvn.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=b854aeca-dab2-4adf-abbb-a90a01309715)

[Python201 - Chapter 5 (Variables)](https://cvn.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=b43588de-0dd5-433a-aacc-a90a0116b717)

[Python201 - Chapter 6 (Looping)](https://cvn.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=6f14a39d-1fde-47d9-9279-a90a0116c0dd)

**Computers in Class**

Computers are a requirement for this course and you are expected to bring one for every class. We’ll do a lot of programming and­ the best way to learn is to see something in action. Python is an especially good language for making things happen! Make sure that your laptops have sufficient charge for the class! Students should have Anaconda Version 5.3 (Python 3.7 version) or greater installed on their personal machines. Download and installation instructions can be found here:<https://www.anaconda.com/download>

Student's will also be given access to a virtual machine (VM) on which they can do all their programming. Once they receive their coupon code, students should follow the setup instructions found here:<https://github.com/logston/py-for-or/> If the student prefers to use their own machine for problem-solving, they may.

**Texts + Other Resources**

There is **NO** textbook for this class. The following will be helpful if you want to go above and beyond the material covered in the course:

* <https://docs.google.com/document/d/1aPl-gu8UO6_5NX-HHcPQy3e7KdBC7yy8aK3hXWriurY>

Some topics in class will require you to search the internet for documentation when building your answer. The purpose of not providing you with full topic coverage in class is so that you can build your proficiency in finding solutions via documentation available on the internet. This is a critically valuable skill in the software development field.

**Class Evaluation Link**

<https://forms.gle/jCEscT8YTWjXFje68>

**Evaluation and Learning Components**

(30%) Homework. There will a homework set after each class session except for the last. The homework is due before the following session.

(15%) Project. There will be one group project. Everyone in the group will share the same final grade for the project.

(20%) Quizzes. We will have three quizzes, all in class. Quizzes are **not** cumulative and only include subject matter covered since the last quiz. Quizzes will be held at the end of class.

(35%) Final. The exam will include topics from the entire course.

**Assignment Details**

When naming your files for upload, you must follow the format below:

*<uni>\_<assignment>\_<details [optional]>.<extension>*

For example, if I needed to hand in HW 0, any of the below formats would be sufficient for a file name:

* pl2648\_hw0.txt
* pl2648\_hw0.sh
* pl2648\_hw0\_all\_in\_one.txt
* pl2648\_hw0\_bash\_program.sh

This naming format allows for autograding of all assignments. If your files are not named with this format, you should expect a grade of zero for the assignment.

Possible points on late homework are deducted by 50% for each day they are late. For example, if you get 80% of the total possible credits on a homework but hand in that homework a day late, you would get 40%. Assignments two days late get zero points.

*Once solutions are posted and graded assignments are handed back, students have 1 week to bring their grading discrepancies to a CA for consideration of possible grading errors.*

**GETTING HELP**

Asking for help is a great way to increase your chances of success. However there are some rules. When asking for help (especially from a fellow student), you can show your helper your code but you can not view theirs. You work needs to be your own.

If you need to reach out to a CA or the Professor for help, **please do so via Piazza** and **not** **via email**. Answers given via Piazza will help you as well as other students. Thus, emails will always have a lower priority for response than Piazza questions.

If you do email the professor or TA, please make a note of what section you are in. This helps us identify you in Courseworks faster.

**QUIZZES AND FINAL**

Quizzes will always be at the end of class. Material in a quiz is predominantly what was covered since the previous quiz but concepts covered before the previous quiz may be required in the upcoming quiz. For example, if functions were covered before the previous quiz and OOP was covered after the previous quiz then OOP will be the focus of the upcoming quiz. However, knowing and using functions will also be required on the upcoming quiz. Material covered in lecture on the day of a quiz will not be on the quiz. Quizzes are 20 minutes. Quizzes should be named with the same naming scheme as is described in the section above “Assignment Details”.

Once a quiz begins, **no talking is allowed until you have completed the quiz, submitted the exam, and exited the exam room**. The only exception is to ask a CA or Professor a question. The final exam follows the SAME no-talking rule as quizzes. This rule is in place to help the quiz proctors maintain a fair quiz environment for all. All quizzes and the final are closed note, closed internet, and closed homework. You may have nothing open except for the exam .ipynb file and courseworks (for downloading and uploading your exam).

If you do not submit your exam during the exam period or within the exam submission period (usually on a minute or two directly following the exam), you will receive zero points for the exam.

**REGRADES**

Occasionally an alternate solution is acceptable for a given problem and the automated graders do not give credit for such unique solutions. If you find yourself in this situation, please **reach out to a TA first**. I will not entertain any assignment regrade discussions until you have first reached out to a TA and either gotten no response for 2 business days *or* have gotten an entirely unfair response from the TA. At that point, please forward me the discussion regarding the regrade and I will regrade as is fair.

**AUDITING**

If want to audit this class, you have my permission. As this is a rather introductory class, all are welcome. Simply send me an email with the title “Request to audit course YXZ” and I will add you as an auditor as my time allows. Please note that space in the class depends on the number of enrolled students and the size of the classroom. Enrolled students have first priority on seats in any class session and all fire rules (capacity limits) will be abided by.

**ENROLLING FROM ANOTHER DEPARTMENT OR COLLEGE**

If you want to enroll, you need to talk the IEOR department instead to get their permission. They have the final say on the roster, not me. I am personally okay with you enrolling for this class.

**LETTERS OF RECOMMENDATION**

Due to the large size of my classes, I can only give letters of recommendation to students that receive an A+ in my class. Even then, a student has to have shown exemplary performance beyond academics to receive such a letter.