**SYLLABUS: Data Bootcamp**

**Spring 2023**

This course is a practical, hands-on introduction to modern data analysis. The focus of this course will be on the Python programming language, but you will also be introduced to the full stack of data analysis tools and ideas so you can apply data systems thinking in broad settings. You will work with economic, business, and other data, and you will leave the semester prepared to take your coding and data analysis journey as far as you want.

The intent of this course is to directly increase your ability to create value for current and future employers and for your own enterprises. You will continue to use traditional analysis and visualization tools like Excel and PowerPoint, but your skills will now also include some coding knowledge, SQL experience, familiarity with machine learning (ML) and artificial intelligence (AI) concepts and business practices, and a portfolio of interesting projects.

**Instructor**

Toby Penk

Email: [tp1488@stern.nyu.edu](mailto:tp1488@stern.nyu.edu)

Office Hours: By appointment

Course website: [GitHub](https://github.com/tobypenk/data-bootcamp)

**Requirements**

There are no prerequisites. This course is designed specifically for students with no prior coding experience.

You will need to have a laptop in class every day. While the device policy for this class is necessarily different from that in non-coding classes, I still expect we’ll all adhere to the spirit of the device policy, which is not to do anything on your machine during class that distracts other students or diminishes your learning experience.

Please bring and display your nameplate in every class.

**Getting help**

Everyone who codes needs help frequently, and I am available via office hours and via email to help troubleshoot any issues you come across. Additionally, we will learn to effectively use Google and the popular engineering Q&A site StackOverflow. We will also not shy away from liberal use of the newest AI-driven coding tools like ChatGPT (while acknowledging their still-significant limitations). The coding field is in a time of exciting change, and we will take full advantage of the latest ideas.

I encourage you to freely discuss all of your assignments with anyone, but anything you submit, including your code, must be your own.

**Course website**

Everything you need, including this syllabus, is posted on the course GitHub. I’ll add session slides, assignments, and any other supporting materials after class each week.

**Deliverables and grades**

There are three pillars to this course:

1. Introduction to the Python programming language. Though Python can be used for everything from game development and software engineering to IT management, we will focus on its data analysis capabilities. This will be a hands-on, practical introduction to Python for data analysis. We will also touch on computer science concepts like algorithm design, so you will be aware of them, but you will not be expected to master these concepts.
2. Introduction to modern data analysis business concepts. Concepts like ML Ops, data engineering, analysis pipelines, and advanced analytical techniques are increasing in importance, even for businesspeople like us who don’t necessarily directly write and execute all the code. We’ll touch on these topics so you can intelligently discuss data ideas at work, and work effectively with data specialist colleagues, and so you can guide your own lifelong self-directed exploration of deeper concepts.
3. Midterm and final projects. You will create real pieces of work you can show potential employers as proof of your new data skillset.

All of these portions of the course will come with graded deliverables, and we will space the work out so there shouldn’t be a big “push” at the end of the semester, but rather a consistent level of moderate work each week. Coding is like riding a bike in that 1) it is useful, fun, and exhilarating; and 2) you have to actually do it a lot to get better.

Graded work includes:

* **Code Practice**. You will have 8 graded coding assignments this semester. These will improve your skill as a coder, and expose you to concepts of algorithm design and software efficiency.
* **Midterm Project.** This will be your first portfolio project: you will use your Python basics to derive a unique insight from a dataset of your choice, and visualize and communicate that insight.
* **Final Project**. You will conduct a professional-level data collection and analysis effort to share with potential employers, as another portfolio project.
  + While you will write some Python code to enable this analysis, the expectation is that you will produce a thoughtful, practical, well-rounded analysis that would actually be useful to a real business, not just an impressive piece of code.
  + You’ll be evaluated on analytical skill, impactful / insightful analysis, and presentation.
* There will be no exams, but you will present your final project during our allocated finals time.

**Due dates** are posted on the course website. **Dates are not negotiable. Anything handed in late will get a grade of zero.** Each week of the course builds on the prior week, so it’s important to keep momentum and get each week’s work done on time.

Final grades will be weighted as follows and not subject to any fixed curve or distribution (i.e., if you all do A work, you’re all going to get an A):

Code practice 50%

Midterm project 15%

Final Project 30%

Participation 5%

**Recommended work habits**

You can’t learn Python just by reading and thinking; you need to write programs. Every program is an experiment, and the results of that experiment, ranging from total success in producing the expected output all the way to crashing your computer, are the feedback mechanisms that will guide your inexorable improvement.

We will use practice-problem websites, particularly [Project Euler](https://projecteuler.net/), to explore the process of writing good code. Usually you will not write good code on your first try; instead, you will iteratively improve the code until it works. Then you will optimize it to work better. You will get better at this over many years.

I encourage you not to limit your use of code to this class; anywhere you have a dataset to analyze or a repetitive task to do on your computer, your first thought should be “how can I save myself some time and headache by making Python do this?”

Finally, I strongly recommend setting aside a little time each day to write code and think about how it works. 20 minutes a day is much better than 3 hours once a week, partly because sleep helps consolidate and integrate memories. The more chances you give yourself to sleep on code you’ve written, the faster you’ll progress.

**Policies**

**ACADEMIC INTEGRITY**

We take pride in our well-rounded education and approach our academics with honesty and integrity. Indeed, integrity is critical to all that we do here at NYU Stern. As members of our community, all students agree to abide by the **NYU Academic Integrity Policies** as well as the NYU Stern Student Code of Conduct, which includes a commitment to:

* Exercise integrity in all aspects of one's academic work including, but not limited to, the preparation and completion of exams, papers and all other course requirements by not engaging in any method or means that provides an unfair advantage.
* Clearly acknowledge the work and efforts of others when submitting written work as one’s own. Ideas, data, direct quotations (which should be designated with quotation marks), paraphrasing, creative expression, or any other incorporation of the work others should be fully referenced.
* Refrain from behaving in ways that knowingly support, assist, or in any way attempt to enable another person to engage in any violation of the Code of Conduct. Our support also includes reporting any observed violations of this Code of Conduct or other School and University policies that are deemed to adversely affect the NYU Stern community.

**STERN CODE OF CONDUCT**

The Stern Code of Conduct and Judiciary Process applies to all students enrolled in Stern courses.

For graduate students, information can be found here: https://www.stern.nyu.edu/uc/codeofconduct.

To help ensure the integrity of our learning community, prose assignments you submit to NYU Brightspace will be submitted to Turnitin. Turnitin will compare your submission to a database of prior submissions to Turnitin, current and archived Web pages, periodicals, journals, and publications. Additionally, your document will become part of the Turnitin database.

**GENERAL CONDUCT & BEHAVIOR**

Students are also expected to maintain and abide by the highest standards of professional conduct and behavior. Please familiarize yourself with Stern's Policy in Regard to In-Class Behavior & Expectations for Graduate and Undergraduate students. (https://www.stern.nyu.edu/portal-partners/registrar/policies-procedures/general- policies/code-conduct) (http://www.stern.nyu.edu/portal-partners/current-students/undergraduate/resources- policies/academic-policies/index.htm) and the NYU Student Conduct Policy ([https://www.nyu.edu/about/policies-guidelines-compliance/policies-and- guidelines/university-student-conduct-policy.html](https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-%20guidelines/university-student-conduct-policy.html)).

**STUDENT ACCESSIBILITY**

If you will require academic accommodation of any kind during this course, you must notify me at the beginning of the course and provide a letter from the Moses Center for Student Accessibility (212-998-4980, mosescsa@nyu.edu) verifying your registration and outlining the accommodations they recommend. If you will need to take an exam at the Moses Center for Student Accessibility, you must submit a completed Exam Accommodations Form to them at least one week prior to the scheduled exam time to be guaranteed accommodation. For more information, visit the CSA website: https://www.nyu.edu/students/communities-and- groups/student-accessibility.html

**STUDENT WELLNESS**

Our aim is for students to be as successful academically as they can, and to help them overcome any impediments to that. Any student who may be struggling and believes this may affect their performance in this course is urged to contact the Moses Center for Student Accessibility (see also the Student Accessibility section of this syllabus) at 212-998-4980 to discuss academic accommodations. If mental health assistance is needed, call the NYU’s 24/7 Wellness Exchange hotline 212-443-9999. Furthermore, please approach me if you feel comfortable doing so. This will enable me to provide relevant resources or referrals. There are also drop in hours and appointments. Find out more at http://www.nyu.edu/students/health-and- wellness/counseling-services.html  
Graduate students can also reach out to the Academic Advising team at academicaffairs@stern.nyu.edu if you would like to receive more information or further support.

**NAME PRONUNCIATION AND PRONOUNS**

NYU Stern students now have the ability to include their pronouns and name pronunciation in Albert. I encourage you to share your name pronunciation and preferred pronouns this way. Please utilize this link for additional information: Pronouns & Name Pronunciation

**RELIGIOUS OBSERVANCES AND OTHER ABSENCES**

NYU Stern is committed to ensuring an equitable educational experience for all students regardless of identity or circumstances and strives to recognize the obligations its students have outside of Stern. Please review all class dates at the start of the semester and review all course requirements to identify any foreseeable conflicts with exams, course assignments, projects, or other items required for participation and attendance. If you are aware of a potential conflict, please contact me as soon as possible to discuss any potential conflicts to determine whether/how they can be accommodated.

**INCLUSION STATEMENT**

*This course strives to support and cultivate diversity of thought, perspectives, and experiences. The intent is to present materials and activities that will challenge your current perspectives with a goal of understanding how others might see situations differently. By participating in this course, it is the expectation that everyone commits to making this an inclusive learning environment for all.*