DS2000 -- Programming with Data
Khoury College, Northeastern University
Fall 2024
Profs. Felix Muzny (he/him & they/them) and Laney Strange (she/her)

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Course web page	http://course.ccs.neu.edu/ds2000
Piazza	https://piazza.com/northeastern/fall2024/ds2000
Gradescope	https://www.gradescope.com/courses/801405
Lecture Schedule	Sec 1: TF 9:50-10:55am (EL AUD) - Strange Sec 2: TF 9:50-10:55am (SN 108) - Muzny Sec 3: TF 1:35-2:40pm (SN 108) - Strange Sec 4: TF 1:35-2:40pm (SN 168) - Muzny

DS2001 is a co-requisite for DS2000; make sure you're signed up for both.

Lecture Format

As an on-ground class, it is expected that you attend in-person. Do what you need to do to be fed/hydrated/prepared to be mentally present in lecture and to participate and engage with your peers and the course content.

If you must attend a lecture remotely due to illness/emergency/unavoidable travel: fill out the Remote Attendance Form, then attend via Zoom (go to Canvas > Zoom Meetings > select the appropriate meeting. If you are attending remotely, you will be attending Prof. Felix's lecture, regardless of the section you are enrolled in. Do expect to be actively participating even if attending remotely. There will be **no** remote options on mini-exam days.

Masking for any reason at all is **always acceptable** in both Prof. Laney and Prof. Felix's sections. Do not come to class in person if you are sick.

Lecture recordings will not be available; if you must completely miss lecture, access lecture materials on the course website and attend office hours to ensure you are caught up.

Office Hours

Instructor Office Hours (Online and In-Person)

Instructor office hours are one-on-one conversations. You can schedule a specific 15-minute slot during office hours. Priority is given to students with an appointment, but you can also just drop in. Both Zoom and in-person are perfectly fine with us, just let us know which you prefer when you make an appointment!

- Prof. Felix's office hours: W 10-11:30am, F 11:30am - 1pm
    - In-person: Meserve 307A
    - Online: https://northeastern.zoom.us/my/muzny
    - Make an appointment: https://cal.com/muzny/officehours
- Prof. Laney's office hours: M 9-10:30am, F 3-4:30pm
    - In-person: Meserve 313
    - Online: https://northeastern.zoom.us/my/laney
    - Make an appointment: https://calendly.com/laneystrange/20-minute-office-hours-with-laney

TA Office Hours (Online and In-Person)

- Course TAs will hold regular office hours throughout the week. The website lists the schedule, and we'll post any changes on Piazza.
- For in-person office hours, please go to the room listed and write your name at the bottom of the list on the whiteboard. A TA will call your name when it's your turn, so please keep an ear out!

- For online office hours, we will be using the queuing system in the Khoury Office Hours app. Have a question ready and add yourself to the queue. When a TA is available, they'll call you on Teams. You can find the system on the Khoury Admin portal (login with your regular Northeastern ID): https://admin.khoury.northeastern.edu/

The 30-minute Guideline
If you get stuck on a homework problem, come by office hours or post on Piazza! We recommend you spend about 30 minutes trying to figure out a problem, and then ask for help or take a break. Enough time that you can try a few things to get unstuck, but not SO much time that you're banging your head against the wall. Try for 30 minutes, then ask us. :)

Recommended Textbooks

- Intro to Python for Computer Science and Data Science. Deitel & Deitel. Pearson, 2019. ISBN: 0135404673. Available free online or purchase.
- Think Python: How to Think Like a Computer Scientist. Allen B. Downey. O'Reilly Media, 2015. ISBN: 1491939362. Available free online or purchase.

You do not need to read the textbooks ahead of lecture; they are most useful as reference materials when coding, or for looking up new examples. Keep them handy when working on the homework or reviewing your lecture notes.

Course Description - DS2000

Introduces programming for data and information science through case studies in business, sports, education, social science, economics, and the natural world. Presents key concepts in programming, data structures, and data analysis through Python. Integrates the use of data analytics libraries and tools. Surveys techniques for acquiring and programmatically integrating data from different sources. Explains the data analytics pipeline and how to apply programming at each stage. Discusses the programmatic retrieval of data from application programming interfaces (APIs) and from databases. Applies data visualization techniques to summarize and communicate the analysis of data.

Beginning programmers are welcome; we don't assume any previous knowledge and we'll start from the very beginning.

The major topics within the course, and their corresponding textbook chapters, are the following (note that the order in which topics are covered might change):

Text Section(s) - Downey	**Topics**
Ch 1, 2.1-2.3	Variables, mathematical operators
Ch 9.1-9.3	Files and data visualization

Ch 5.17	Iteration (loops) and lists
Ch 3.1-3.7	Conditionals
Ch 5.7-5.8, 4	Functions
Ch 5.16-5.18	2D lists
Ch 6.1-6.2	Dictionaries
Ch 10	Classes & Objects

Evaluation

Evaluation

You will receive separate grades for DS2000 and DS2001. Your DS2000 grade will be based on the following factors:

Factor	**Number**	**Weight**
Homework Sets HW1-6 are assigned work HW7 is a second-chance	6	75%
Mini-Exams	2	25%
	TOTAL	**100%**

You'll submit homeworks through Gradescope, and mini-exams will be administered on paper.

Letter Grades

Your final grade for DS2000 will use the following breakpoints to convert from letter to number grades. We use natural rounding to get these whole numbers, e.g., 96.5 becomes a 97 but 96.4 becomes 96.

Letter	**Range**
A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82

C+	77-79
C	73-76
C-	70-72
D	60-69
F	< 60

Homeworks

Homeworks are assigned (almost) every week. They are due one week after they are assigned, unless otherwise noted.

Homeworks will be evaluated according to the DS2000 Rubric & Styleguide. We'll also share grading notes specific to each individual homework. Make sure you keep the rubric and those notes handy as you're working on an assignment.

The final assignment of the semester, Homework 7, will be a second-chance homework. You can use this homework to re-submit one of Homework 1-5, and we'll re-grade it. (HW6 is not eligible for resubmission.) It's a chance to re-do a homework that didn't go as well as you'd hoped, or submit one where you'd missed the original deadline.

Your homework score will be the average of HW1-6.

When you submit a homework on Gradescope, the system will run your code and you'll be able to see the output. **Make sure you review this!** Your grader will see the exact same output, and much of your grade will be based on it. You can resubmit your homework as many times as you like, up until the deadline -- so if you spot a problem on Gradescope, fix it and resubmit!

Mini-Exams

We'll have two short exams during the semester. Both are administered in-person during lecture. Please make sure they are on your calendar so you don't miss class that day.

Mini-Exam dates are:

- Friday, October 4th
- Tuesday, October 29th

Mini-Exams will be on paper. You may bring one 8.5x11-inch cheat sheet with anything written or typed on it, one side only. No other materials will be permitted.

You will have the entire 65-minute class period to complete the mini-exams, but they are designed to be

shorter. Take your time, answer all questions completely, and double-check your work.

If you have a DAS accommodation related to exams, it is your responsibility to arrange to take the exams in the DAS office. Make sure you set this time up at least a week ahead of the scheduled exams to guarantee the time and space you need.

Late/Makeup Policy

- ***Homework Late Policy*** - You can submit homeworks up to 48 hours late with no penalty. ***No other late submissions will be accepted.*** This policy exists for those times you're having a tough week, are feeling sick, or are falling behind in your work; we won't make any exceptions to this policy. If you have any questions about this policy, email Prof. Laney (laneys@northeastern.edu).

- ***Second-Chance Homework*** - At the end of the semester, you can resubmit one of Homeworks 1-5 for a new grade. You can review and consider the feedback you receive from us as part of your graded work, and use that to revise and build a better solution. Your second-chance homework may NOT be submitted late.

- ***Mini-Exams*** - You must take the exams during class on the published dates. Make sure they are on your calendar!

Software

We'll be using Python 3 in this class. PyCharm Community Edition (https://www.jetbrains.com/pycharm/download) is our official editor for DS2000, which we'll use to write and run Python code. If you like and use another editor that's totally fine, but we'll use PyCharm in lectures and office hours, and we'll be able to help you out if something goes wrong.

Check out the PyCharm Intro video linked on the course calendar!

Communication

The simplest way to get feedback and help from course staff and from your classmates is via Piazza. Piazza is an extension of our classroom discussion, and we expect everyone to behave accordingly. No disrespect, rudeness, or abuse will be tolerated -- towards fellow students or towards the course staff. Piazza will be disabled if we feel it is being misused.

You may not post your code on Piazza, but you can ask, answer, and discuss different things you've tried, what worked and didn't work, and resources you've found.

We'll also use Piazza to post course announcements, so make sure your email settings are turned on!

Email (f.muzny@northeastern.edu, laneys@northeastern.edu) is the best tool for specific questions or

concerns about your experience in class or anything sensitive in nature. During the week, we'll respond within 24 hours, but don't expect a response after 6pm. On the weekends we'll be slower to respond, but if you reach out over a weekend you can expect to hear back Monday morning.

Office hours are the best place for talking through your approach to a homework problem. We're not here to give you answers, of course, but to be your fellow data scientists thinking through a tough problem with you. Expect us to ask more questions than we answer.

Inclusive Classroom

In our classroom, please ask questions, and answer questions! In programming, we seldom get anything right on the first try. We see how an attempt turned out, and we try again. We like our classroom to reflect that approach as well; so please answer a question that's been posed, even if you're not sure of the answer.

To create and preserve a classroom atmosphere that optimizes teaching and learning, all participants share a responsibility in creating a civil and non-disruptive forum for the discussion of ideas.

We believe that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to Laney to make alternative arrangements.

Lecture Questions

We invite everyone to raise their hands to ask and answer questions during class, and to engage in discussion with classmates. However, we know it’s not always the easiest thing to speak up in a big classroom, or to clarify your thoughts in real time.

Therefore, you can also ask Felix and Laney questions directly via the Lecture Question form. We will review these questions and respond during an upcoming lecture or on Piazza, keeping you anonymous.

Name and Pronoun Usage

As this course includes some discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform Laney/Felix of the necessary changes.

- If you wish to add, change, or update your pronouns in Canvas, go to "Account" > "Profile" > "Edit Profile", then add, change, or update your pronouns and display name.
- If you wish to change or update your name here at Northeastern as a whole, find instructions with the registrar here.

Students are expected to conduct themselves at all times in a manner that does not disrupt teaching or learning. This class is designed for beginners. If you happen to have some experience with Python, we expect you to be supportive and respectful of your classmates who don't.

Academic Integrity

You are free to discuss homeworks and share ideas with your classmates. **You may not share code, and you may not post code on piazza**.

Searching online and looking for ideas is acceptable, as long as (1) you do not directly copy any code (more below), (2) you cite any outside sources that you referenced in a comment in your code, and (3) you do not ask TAs or instructors to help you with code you found online. We'll help you work out problems with your code, not someone else's.

Copying solutions from a classmate or online source is a violation of our academic integrity policy and will result in a 0 on the assignment/exam and a report filed with OSCCR. The university's academic integrity policy discusses actions regarded as violations and consequences for students: https://osccr.sites.northeastern.edu/. Note that "copying" includes any medium that transfers one student's code to another student, whether it be by showing it to them, telling to them, or by other means.

This ***includes*** the code from large language models (ChatGPT, etc.).

A further note on this course's policy to not allow usage of large language models and AI chatbots like ChatGPT: you are here to learn a new skill. This is a difficult thing to do and it can be very enticing to use tools like these. These tools will be far more useful to you in the future if you do everything in your power to learn and practice the fundamentals on your own. You should always be able to explain every part of the code you use and write.

Student Services

If you require support during the course due to a disability please ensure that you are already registered with the University's Disability Access Services, and contact Profs. Felix and Laney to coordinate any support needed during the course.

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: Title IX.