

Data 3402: Python for Data Science 2

Spring 2025

Instructor Information

Instructor

Amir Farbin

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CPB-340

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Faculty Profile

<https://mentis.uta.edu/explore/profile/amir-farbin>

Office Hours

Best time to quickly chat with me is after class. Otherwise, I am generally available and am happy to meet virtually. If you like to speak to me, please send a chat message via Teams, letting me know when you would be available in the next 24-48 hours and I will follow up.

Course Information

Section Information

DATA 3402

Time and Place of Class Meetings

- Lectures: MW 1-2:20 in SEIR 298
- Lab: F 1-2:50 Virtual

Description of Course Content*DATA 3401 -- Python for Data Science 1*

This is the first of a two-course sequence offering the foundations of Python programming in the context of data science. It introduces the full syntax of the Python language as it overviews structured, functional, and object-oriented programming methodologies. It also provides a basic conceptual understanding of computing and introduces Unix command-line tools, software employed in data science, such as git and Jupyter, and Python libraries such as numpy, matplotlib, and Pandas.

DATA 3402 -- Python for Data Science 2

This is the second of a two-course sequence offering the foundations of Python programming in the context of data science. It reinforces concepts presented in DATA 3401 with greater depth and a focus on application to various problems in data science, while further exploring the python library ecosystem.

Required Textbooks and Other Course Materials

No text book required for the course. All material will be made available on GitHub for the students.

Lectures

The course lectures will be in-person, meaning you are expected to be in class. Unless I'm sick, need to be quarantined, or traveling, I will be teaching in the class room. Nonetheless, I will also use Teams to record the lectures and enable students to connect remotely if necessary. We will take attendance in every class period including labs. Attendance is 20% of your grade. If you are missing class for any reason, you need to write the professor and the TAs and let them know.

Labs

The course labs will be all virtual and run via Teams. I've found virtual labs to be much more effective than in person.

Course Communications

All course communications will be made on Teams. Please do not use e-mail. Also make sure you have Teams app installed and you are looking at Teams notifications. I also encourage students to ask questions and interact with me and the TA via Teams chat.

Descriptions of major assignments and examinations

Your grade will primarily based on your performance on weekly assignments (labs) and your final project. See grading breakdown below. About half-way through the course, you will be required to take the python proficiency exam from the python institute (pythoninstitute.org/pcep) at a cost of \$59. Your performance on the exam will not affect your grade in the course, but submission of your results is 10% of your grade.

Technology Requirements

You have several options on how to work on assignments. In all cases you will need access to a computer (laptop or desktop) with a keyboard and mouse. Tablets are not recommended. Your options:

- **Laptop (Preferred):**
 - OS: Windows (with WSL installed), MacOS, or Linux
 - You will install and run everything locally. For the most part, almost any laptop will do. Later in the course, some of the assignments may require significant disk space / memory. If your laptop can't handle it, you can switch to use cloud option (see below).
 - You should bring your laptop to the lab sessions.
 - Note: A limited number of laptops (5) are available for checkout, specifically for this course, at the library.
- **Desktop:**
 - OS and software setup will be identical to laptop option.
 - For in-person labs, you will have to fall back to cloud option below.
- **Cloud:**
 - You have the option of working on labs/projects on Google's Colab platform and storing your files in Google Drive.

Grading Information

Grading

- Attendance: 20%
 - Quizzes are intended as means of ensuring student attendance, allow the instructors to assess student progress, and as means of initiating specific discussions. They will very generously graded and intended to help boost grades.
 - You are allowed 2 missed class period over the semester.
- Python Proficiency Exam: 10%
- Labs (~8): 50%
 - Typically 1-2 weeks per lab.
 - Drop 1 lowest grade (including being sick, unless previously made arrangements).
- Project: 20%
 - Kaggle Challenge. Presentation during finals.

All grades will be curved, if need be. The exact curving methodology will be the topic of a lecture. It is extremely important to not fall behind in this course.

Expectations for Out-of-Class Study

You are expected to spend about 10 hours per week working on this course outside of lecture and lab hours.

Help

In addition to the instructor, the course TA will be available via Teams for help.

Course Schedule

The following schedule and topics list is tentative. This course is continuously under development and I will adjust course content to the needs of students. *As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.*

Amir Farbin

- Class Introduction
 - “My Research”
- How do computers work?
 - From transistor to iPhone
 - Storage / Filesystem
 - Firmware → Operating System → Apps
 - Machine Language → Python
- 1st Lab session:
 - WSL, Google Colab, Linux, GitHub.
 - Lab 1: Basic shell commands
- Review of Structured Programming
 - Building a simple game: Checkers
 - Lab 2: Tic-tac-toe
- Functional Programming
 - Probability and statistics, histograms, fundamental distributions
 - Random Numbers
 - List comprehensions, functools, ...
 - Data Processing
 - Lab 3: Random / Distributions / Histograms / Monte Carlo
- Object Oriented Programming
 - Overview. Design Patterns. UML.
 - How does it work?
 - Tensor Operations (numpy): Matrix, ...
 - Lab 4: Plotting software (Matplotlib): Canvas, ...
 - Lab 5: Persistification + Data Representation (Pandas): CSV Reader, DataFrame ...
 - Scripting vs Building Software
 - Gradebook Example
 - Simulation Example
 - Lab 6: Blackjack Simulation
- Data Analysis
 - Visualization
 - Data Processing / Summary
 - Hypothesis Testing

- Domain Introduction: High Energy Physics
- Lab 7: HEP Data
- Machine Learning (Scikit-learn)
 - Supervised Learning: Classification, Regression
 - Lab 8: Classification
- Projects + Targeted topics.
 - Proposal
 - Check in at every Lecture
- Advanced/Targeted Topics (→ Finals)
 - Deep Learning
 - Lab 9: Deep Learning (Optional)
 - Computation
 - Mutli-treading/multi-processing
 - TensorFlow/PyTorch as computation engines

University & Course Policies

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the [Institutional Information](https://resources.uta.edu/provost/course-related-info/institutional-policies.php) page (<https://resources.uta.edu/provost/course-related-info/institutional-policies.php>) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Attendance

Attending class sessions is a critical predictor and indicator of student success. The University of Texas at Arlington does not recognize a single attendance policy but encourages faculty to establish class-specific policies on attendance. As the instructor of this section,

The U.S. Department of Education requires that UT Arlington have a mechanism in place to verify Federal Student Aid recipients' attendance in courses. UT Arlington instructors are expected to report the last date of attendance when submitting students' final course grades; specifically, when a student earns a course grade of F, instructors must report the last date a student attended their class. For on-campus classes, last date of attendance can be based on attendance rosters or on academic engagements—a test, participation in a class project or presentation, or Canvas-based activity. Online or distance education courses require regular and substantive online interaction and participation. Students must participate in online course activities in Canvas to demonstrate attendance; logging into an online class is not sufficient by itself to demonstrate attendance. The last date of attendance is reported to the U.S. Department of Education for federal financial aid recipients.

Generative AI Use in This Course

The use of Generative AI (GenAI) in course assignments and assessments must align with the guidelines established by the instructor. Unauthorized use of GenAI could result in breaches of academic integrity. Instructors bear the responsibility of clearly delineating the permissible uses of GenAI in their courses, underscoring the importance of responsible and ethical application of these tools.

The [UTA Office of Community Standards](#) articulates the university's stance on [academic integrity and scholastic dishonesty](#). These standards extend to the use of GenAI. Unauthorized or unapproved use of GenAI in academic work falls within the scope of these policies and will be subject to the same disciplinary procedures.

As the instructor of this course, I have adopted the following policy on Student use of GenAI: Prohibition of GenAI Use.

In this course, the focus is on the development of independent critical thinking and the mastery of subject-specific content. To ensure that all submitted work accurately reflects personal understanding and original thought, the use of Generative AI (GenAI) tools in completing assignments or assessments is strictly prohibited. This policy supports our commitment to academic integrity and the direct measurement of each student's learning against the course's Student Learning Outcomes (SLOs). Any work found to be generated by AI will be subject to academic review. I also want to note that GenAI currently often give wrong answers to physics problems.

Academic & Wellness Resources

Academic Success Center

The Academic Success Center (ASC) includes a variety of resources and services to help you maximize your learning and succeed as a student at the University of Texas at Arlington. ASC services include supplemental instruction, peer-led team learning, tutoring, mentoring and TRIO SSS. Academic Success Center services are provided at no additional cost to UTA students. For additional information visit: [Academic Success Center](https://www.uta.edu/student-success/course-assistance) (<https://www.uta.edu/student-success/course-assistance>). To request disability accommodations for tutoring, please complete this [tutoring request form](https://www.uta.edu/student-success/course-assistance/tutoring/request) (<https://www.uta.edu/student-success/course-assistance/tutoring/request>).

The English Writing Center (411LIBR)

The Writing Center offers **FREE** tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at the [Writing Center](https://uta.mywconline.com) (<https://uta.mywconline.com>). Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see [Writing Center: OWL](http://www.uta.edu/owl) (<http://www.uta.edu/owl>) for detailed information on all our programs and services.

Academic Plaza

The Library's 2nd floor [Academic Plaza](http://library.uta.edu/academic-plaza) (<http://library.uta.edu/academic-plaza>) offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the [library's hours](https://library.uta.edu/hours) (<https://library.uta.edu/hours>) of operation.

UTA CARE Team

UT Arlington is committed to the safety, success, and well-being of our students. To support our community, UTA has created a CARE Team, which is a dedicated group of campus professionals responsible for helping students who could benefit from academic, emotional, or psychological support, as well as those presenting risk to the health or safety of the community. If you know of someone experiencing challenges, appearing distressed, needing resources, or causing a significant disruption to the UTA community, please submit a [CARE Referral](#) by visiting the [Behavior](#)

[Intervention Team](https://www.uta.edu/student-affairs/dos/behavior-it) (<https://www.uta.edu/student-affairs/dos/behavior-it>) page. You may also submit a referral for yourself if you would like additional support.

NOTE: If a person's behavior poses an immediate threat to you or someone else, contact UTA Police at 817-272-3303 or dial 911. If you or someone you know needs to speak with a crisis counselor, please reach out to the [MAVS TALK 24-hour Crisis Line](https://www.uta.edu/student-affairs/caps/crisis) (<https://www.uta.edu/student-affairs/caps/crisis>) at 817-272-8255 or the [National Suicide and Crisis Lifeline](https://988lifeline.org/) (<https://988lifeline.org/>) at 988.

Student Services

Everything you need to make the most of your time as a student (and beyond) is all on campus. Below are a few resources to get you started.

- [Student Services Home](#)
- [Student Access and Resource \(SAR\) Center](#)
- [Military and Veteran Services](#)
- [Health Services](#)
- [Counseling and Psychological Services \(CAPS\)](#)
- [Activities and Organizations](#)
- [Recreation](#)

Librarian to Contact


Each academic unit has access to [Librarians by Academic Subject](http://www.uta.edu/library/help/subject-librarians.php) (<http://www.uta.edu/library/help/subject-librarians.php>) that can assist students with research projects, tutorials on plagiarism and citation references as well as support with databases and course reserves.

Safety Information & Resources

Face Covering Policy

Face coverings are not mandatory; all students and instructional staff are welcome to wear face coverings while they are on campus or in the classroom.

Emergency Exit Procedures

Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit, which is located [ **Insert a description of the nearest exit/emergency exit**]. When exiting the building during an emergency, do not take an elevator but use the stairwells instead. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

MavAlert System

The MavAlert system sends information to cell phones or email accounts of subscribed users in case of an emergency. Anyone can subscribe to MavAlerts at [Emergency Communication System](https://www.uta.edu/uta/emergency.php) (<https://www.uta.edu/uta/emergency.php>).

Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381
