

Data 3402: Python for Data Science 2

Fall 2023

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

MW 2:20 am - 3:50 pm (after lecture). I am generally available otherwise and am happy to meet virtually. Please contact me via Teams chat to make arrangements.

Course Information

Section Information

DATA 3402

Time and Place of Class Meetings

- Lectures: MW 1-2:20 in PKH 109
- Lab: F 11-12:50 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. I will periodically take attendance and give unscheduled in-person Quizzes.

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

Course announcements will be made on Teams. I also encourage students to ask questions and interact with me and the TA via Teams.

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 constitute 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

- Quizzes/Attendance: 10%
 - 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.
 - Drop 2 lowest / missed quiz or missed class period.
- Python Proficiency Exam: 10%
- Labs (~7): 55%
 - Typically 1 week per lab.
 - Drop 1 lowest grade (including being sick, unless previously made arrangements).
- Project: 25%
 - Kaggle Challenge. Presentation during finals.

All grades will be curved. 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 under development and I will adjust course content to the needs of students.

- Class Introduction
 - 1st Lab session:
 - WSL, Google Colab, Linux, GitHub.
 - “My Research”
- Review of Structured Programming
 - Building a simple game: Checkers
 - Lab 1: Tic-tac-toe
- Functional Programming
 - List comprehensions, functools, ...
 - Data Processing
 - Lab 2: Random / Distributions / Histograms / Monte Carlo
- Object Oriented Programming
 - Overview. Design Patterns. UML.
 - How does it work?
 - Tensor Operations (numpy): Matrix, ...
 - Lab 3: Plotting software (Matplotlib): Canvas, ...
 - Lab 4: Persistification + Data Representation (Pandas): CSV Reader, DataFrame ...
 - Scripting vs Building Software
 - Gradebook Example
 - Simulation Example
 - Lab 5: Blackjack Simulation
- Data Analysis
 - Visualization
 - Data Processing / Summary
 - Lab 6: HEP Data
- Machine Learning (Scikit-learn)
 - Supervised Learning: Classification, Regression
 - Lab 7: Classification
- Projects + Targeted topics.
 - Proposal
 - Check in at every Lecture
- Advanced/Targeted Topics (→ Finals)
 - Deep Learning
 - Computation
 - Mutli-treading/multi-processing
 - TensorFlow/PyTorch as computation engines

Institutional Information

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

Additional Information

Face Covering Policy

While the use of face coverings on campus is no longer mandatory, all students and instructional staff are strongly encouraged to wear face coverings while they are on campus. This is particularly true inside buildings and within classrooms and labs where social distancing is not possible due to limited space. If a student needs accommodations to ensure social distancing in the classroom due to being at high risk they are encouraged to work directly with the Student Access and Resource Center to assist in these accommodations. If students need masks, they may obtain them at the Central Library, the E.H. Hereford University Center's front desk or in their department.

Attendance

At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I expect students to attend all lecture. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

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.

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](#). To request disability accommodations for tutoring, please complete this [form](#).

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
