Data 3402: Python for Data Science 2

Fall 2021

Instructor Information

Instructor
Amir Farbin

Office Number
CPB-340

Office Telephone Number
817-272-1178

Email Address
afarbin@uta.edu

Faculty Profile
https://mentis.uta.edu/explore/profile/amir-farbin

Office Hours
MW 11 am - 1 pm (prior to lecture). I am generally available otherwise and am happy to meet virtually. Please email to make arrangements.

Course Information

Section Information
DATA 3402

Time and Place of Class Meetings
- Lectures: MW 1-2:20 in TH 102
- Lab: F 11-12:50 in PKH 313

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
I intend to run the course in hybrid mode for the semester. Unless I'm sick or need to be quarantined, I will be teaching in the class room.I find that I am a much more effective lecturer in-person and I encourage students that can safely be present to join me. However I understand that some students at times will need to be quarantined or will need to be remote to protect their health or their family members. Please contact me if you intend to be remote.

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.

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 Collab.

Grading Information

Grading

- Quizzes: 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.
- Labs (~9): 60%
  - Typically 1 week per lab.
  - Drop 1 lowest grade (including being sick, unless previously made arrangements).
- Project: 30%
  - 4 Presentations, details TBA.

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
A TA will be offering about 10 hours of “clinic” time per week where students can get help. The TA will also be available for additional help as needed.

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 (Week 1)
    - WSL, Google Colab, Linux
    - GitHub
- Review of Structured Programming (Week 2)
    - Building a simple game: Checkers
    - Lab 1: Tic-tac-toe
- Functional Programming (Week 3)
    - List comprehensions, functools, …
    - Data Processing
    - Lab 2: Random / Distributions / Histograms / Monte Carlo
- Object Oriented Programming (Weeks 4-7)
    - Overview. Design Patterns. UML.
    - How does it work?
        - Lab 3: Tensor Operations (numpy): Matrix, …
        - Lab 4: Plotting software (Matplotlib): Canvas, …
        - Lab 5: Data Representation (Pandas): CSV Reader, DataFrame …
    - Scripting vs Building Software
        - Lab 6: Gradebook Example
- Data Analysis (Week 8)
    - Visualization
    - Data Processing / Summary
    - Lab 7: HEP Data
- Machine Learning (Scikit-learn) (Weeks 9-10)
    - Supervised Learning: Classification, Regression
    - Lab 8: Unsupervised Learning: Clustering, …
    - Lab 9: Deep Learning
- Projects + Targeted topics. (Weeks 11 → Finals)
    - Proposal
    - Feasibility
    - Prototype
    - Production
- Advanced/Targeted Topics (Weeks 11 → Finals)
    - Decorators
    - 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 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

[Additional information specific to your College, School, Departmental, or Program may also be included in the syllabus. Check with your academic unit's leadership for details.]

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, [insert your attendance policy and/or expectations, e.g. "I will take attendance sporadically" or "I have established the following attendance policy: …"] 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.

For hybrid courses, faculty can add language that clarifies attendance, such as "This is a Tuesday/Thursday hybrid course that meets every Tuesday face-to-face, and online on Thursday. Students are expected to attend both sessions." Or if rotating students through your course, the suggested language may be: "This is a Tuesday/Thursday hybrid course that rotates students through the face-to-face session. Half the class meets on Tuesday face-to-face, and the other half meets online through a live feed (or engage in online activities). On Thursday, students switch. Students are expected to attend both sessions."

[**Important!** Be sure that you include this section on attendance, even if you do not track attendance or factor attendance into the grade. It is important that students understand that any attendance rules applied in your course are your own and *not* a matter of institutional policy. Doing so will keep the University in compliance with Federal regulations as they apply to Title IV funding. If

you are teaching a course in which attendance / hours must be tracked to meet other non-institutional requirements (e.g., to earn an academically-grounded professional credential), be sure to clearly indicate the agency that has established the requirement.

Lab Safety Training
[Required for laboratory courses in the Colleges of Engineering and Science where students may be working with chemicals, biological material, radiological material or lasers] Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities. Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., Fall through Summer II) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

Emergency Exit Procedures
[Required for face-to-face courses; should be omitted for online courses] 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.

[This section requires faculty members to be fully aware of the exits nearest their classrooms, even before the semester begins. Evacuation plans may be found at Evacuation Route Maps (Buildings). In the case that you are unable to ascertain this information in time for your syllabus, you must be sure to explain to your students on day one how best to exit the building. Inclusion of this verbiage as well as a brief discussion on the matter with your students at the beginning of the term is mandated by UT Arlington Procedure 7-6: Emergency/Fire Evacuation Procedures.

[Should you learn that your class roster includes students with physical/sensory disabilities, you should arrange to meet *in private* with each of these students to discuss their needs for assistance in the event of an emergency evacuation.]

Students should also be encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at Emergency Communication System.

Academic Success Center
[Required for all undergraduate courses] 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.

The IDEAS Center (https://www.uta.edu/ideas/) **(**2nd Floor of Central Library) offers **FREE** tutoring and mentoring to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

The English Writing Center (411LIBR)
[Optional.] 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). Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see Writing Center: OWL for detailed information on all our programs and services.

The Library's 2nd floor 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 of operation.

Librarian to Contact
[Optional.] Each academic unit has access to Librarians by Academic Subject that can assist students with research projects, tutorials on plagiarism and citation references as well as support with databases and course reserves.

Emergency Phone Numbers

[Optional but strongly recommended] Enter the UTA Police Department's emergency phone number into your own mobile phone.] 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

Library Information

This final section is not part of the syllabus template, but a message from the UT Arlington Library.

Faculty members should feel free to incorporate any of the following information into your course syllabus or other course materials.

Research or General Library Help
Ask for Help

- Academic Plaza Consultation Services (library.uta.edu/academic-plaza)
- Ask Us (ask.uta.edu/)
- Research Coaches (http://libguides.uta.edu/researchcoach)

Resources

- Library Tutorials (library.uta.edu/how-to)
- Subject and Course Research Guides (libguides.uta.edu)
- Librarians by Subject (library.uta.edu/subject-librarians)
- A to Z List of Library Databases (libguides.uta.edu/az.php)
- Course Reserves (https://uta.summon.serialssolutions.com/#!/course_reserves)
- Study Room Reservations (openroom.uta.edu/)

#######