Computation for Analytics

MSDS 501 (1 units)
Summer 2023

Instructor Information

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Office Hours
Monday/Friday 12-1pm

Course Description

An intense review of Python programming and an introduction to a variety of computational problems. Topics include functions, recursion, loops, list comprehensions, elementary data structures, reading and writing files, image processing, and gradient descent optimization.

Course Learning Outcomes

Through this course, the students will learn computer organization and Python programming for data science. We will practice what a data scientist will use on a daily basis.

- We will practice shell commands using Terminal.

- We will use version control via Git and GitHub.

- We will review core concepts in Python, including data types, conditional statements, loop, file I/O, data aliasing, function, and object oriented programming (OOP)

- We will also learn concepts of packages/libraries and a few useful ones, including pytest, numpy, etc.

- Most importantly, we will learn about how we can approach programming as problem-solving.

- We will practice writing clean code using PEP (Python Enhancement Proposals).
- We will also write codes on cloud computing resources.

Assignments

Key Dates

Programming Assignment (By 9 pm)

Date
July 13
July 20
July 27
August 3
August 10

Quiz (1-2 PM: Strictly In-person)

Date
July 14
July 21
July 28
August 4
August 11

Assignment Policies

- All assignments should be submitted on time via Canvas.
  - No late submission is allowed.
  - No submissions via Slack is allowed.
- In order to pass this course, students are expected to receive at least 50% of each category. (Ex. receiving less than 29/60 on your quiz might not be a satisfying grade.)
- Questions/discussions regarding assignments and course topics should be posted on Piazza (rather than slack or email) and visible to the instructor and other classmates.

- Quizzes will be monitored and recorded by the instructor and/or proctoring system. (In-person attendance is required)
- Plagiarized works will receive at least 0 for the assignment or the assignment category. If plagiarism happens, your professionalism score will be 0. Also, further action will be taken based on the program policy (https://myusf.usfca.edu/arts-sciences/data-science/program-policies)
  - Based on the university's academic integrity policy, individual assignments should be completed independently (unless I allow working within an assigned group).
    - If you have any questions or need to discuss, please post on Pizza or come to the office hour.
    - For programming assignments, plagiarism will be checked by Stanford MOSS (https://theory.stanford.edu/~aiken/moss/).
    - Codes with similarity scores higher than 40% would be reviewed.

Grading Breakdown and Grading Policies

Grading Breakdown

- Attendance and Professionalism - 10 %
- Weekly Assignments - 20 %
- Quiz - 70 %

Grading Policies

This class is a standard, graded course with letter grades A - F.

- I consider an A grade to be above and beyond what most students have achieved.
- A B grade is an average grade for a student or what you could call "competence" in a business setting.
- A C grade means that you either did not or could not put forth the effort to achieve competence.
- Below C (F) implies you did very little work or had great difficulty with the class compared to other students.

The expected final score for this course is 85 ± 3 (and close to normal distributions). The following grades will be given if the class grade distribution falls within the expectation.

Score	Letter Grades
90 - 100	A+, A and A-
80 - 90	B+, B and B-
70 - 80	C+, C and C-
Below 70	F

However, if the grade distribution does not meet the aforementioned criteria, grades will be curved.

Texts and Supplies

Python Documentation
https://docs.python.org/

The Hitchhiker's Guide to Python
https://docs.python-guide.org/

Python Enhancement Proposals
https://peps.python.org/

pytest Documentation
https://docs.pytest.org/

AWS Documentation
https://docs.aws.amazon.com

NumPy Documentation
https://numpy.org/doc/

Conda Documentation
https://docs.conda.io/en/latest/

Google Cloud Documentation
https://cloud.google.com/docs

Git Documentation
https://git-scm.com/doc

GitHub Documentation
https://docs.github.com/en

Course Schedule

Week	Day	Topics
Week1	Day1	Class Intro, Basic Computer Architecture, Terminal and Shell Commands
Week2	Day2	Version Control & Git, Programming & Python, Python Packages/Libraries, Debugging, Error Handling
	Day3	Data Types, Conditional Statements, Loop
Week3	Day4	File I/O, Data Aliasing, Function, Pytest (Unit Test)
	Day5	Programming Patterns
Week4	Day6	Packages, Libraries and Modules
	Day7	numpy
Week5	Day8	Object Oriented Programming
	Day9	PEP8 and PEP20, Problem Solving
Week6	Day10	Programming in Cloud Computing
	Day11	No Lecture

This class will be conducted in a [flipped classroom](#) style. I will provide recorded lectures for you to watch, and you will be required to complete review quizzes based on the content. The quizzes will help yourself determine which days you will need to join discussion sessions. This approach is known to help students learning outcome to have a solid understanding of the material and enhancing experiences.

- Friday 10 - 12 : Required for everyone. Advanced Levels
- Monday 10 - 12 : Optional. Intermediate Levels.

Discussion Session Schedule

Days	Topics
July 7, 10	Day 1, Day 2
July 14, 17	Day 3, Day 4

July 21, 24	Day 5, Day 6
July 28, 31	Day 7, Day 8
August 4, 7	Day 9, Day 10

Program Learning Outcomes

- Effectively use modern programming languages (e.g., R, Python, SQL, etc.) and technologies (AWS, Hive, Spark, Hadoop, etc.) to scrape, clean, organize, query, summarize, visualize, and model large volumes and varieties of data.

Attendance Policy

- All student laptops must be closed during class unless we are doing a lab or I specifically ask you to follow along as I type into my computer. All materials for the course are available on Canvas.
- No cell phones, social media, slack, or texting during the class.
- No late submissions are allowed.

University Policies

Credit-hour Policy

One unit of credit in lecture, seminar, and discussion work approximates one hour of direct faculty instruction (or 50 minutes plus a break) and a minimum of two hours of out-of-class student work per week through one 15-week semester. For further details, see USF's Credit Hour Policy.

Students with Disabilities

The University of San Francisco is committed to the full participation of all students. Student Disability Services (SDS) recognizes disability as a valued aspect of diversity and works to facilitate equal access and an inclusive environment for students with disabilities. The University offers many services to its students with disabilities. Student Disability Services (SDS) arranges these

accommodations on an individual basis for each eligible student during the intake/eligibility process. You can initiate the [intake and eligibility](#) process through the office, or email or call SDS at sds@usfca.edu or (415) 422-2613. (All communication with SDS is private and confidential.) If you are determined eligible for accommodations, please request that your accommodation letter be sent to me as soon as possible; students are encouraged to contact SDS at the beginning of the semester, as accommodations are not retroactive. Once I have been notified by SDS of your accommodations we can discuss your accommodations and ensure your access to this class or clinical setting. For more information please visit the SDS [website](#).

Behavioral Expectations

All students are expected to behave in accordance with the Student Conduct Code and other University policies (see the USF [Fogcutter](#)). Students whose behavior is disruptive or who fail to comply with the instructor may be dismissed from the class for the remainder of the class period and may need to meet with the instructor or Dean prior to returning to the next class period. If necessary, referrals may also be made to the [Student Conduct process](#) for violations of the [Student Conduct Code](#).

Academic Integrity

As a Jesuit institution committed to *cura personalis*—the care and education of the whole person—USF has an obligation to embody and foster the values of honesty and integrity. All members of the USF academic community are responsible for maintaining the standards of honesty and integrity.

The [honor code](#) applies to all students (undergraduate and graduate) in the College of Arts and Sciences, the School of Education, the School of Management, and the School of Nursing and Health Professions. Faculty and students in the School of Law should review their own honor code for policies and procedures. Students enrolled in distance learning (online courses) are subject to these policies as well as supplemental policies set forth by their program.

- Cheating

  Cheating is the use or attempted use of unauthorized materials, information, and study aids, as well as unauthorized collaboration on examinations and other academic exercises. It is the responsibility of students to consult with their professors concerning what constitutes permissible collaboration. Cheating or helping others cheat is academic fraud.

- Plagiarism

  Plagiarism is the act of presenting, as one's own, the ideas or writings of another; plagiarism, in any of its forms, violates academic integrity. While different academic disciplines have different norms of attribution, all strive to recognize and value individuals' contributions to the larger body

of knowledge. It is the responsibility of students to consult with their professors in order to understand the norms of attribution in each discipline and area of study.

- False Citations

  False citation is attribution to an incorrect or fabricated source; false citation is academic fraud. False citation seriously undermines the integrity of the academic enterprise.

- Submitting the Same Work for Multiple Assignments

  Students may not submit work (in identical or similar form) for multiple assignments without the prior, explicit approval of all faculty to whom the work will be submitted. This includes work first produced at USF or at another institution attended by the student.

- Submitting False Data

  False data is information that has been fabricated, altered, or contrived in such a way as to be misleading; the submission of false data is academic fraud.

- Falsifying Academic Documentation

  Forging or altering academic documentation (including transcripts, signatures, letters of recommendation, certificates of enrollment or standing, registration forms, and medical certifications) concerning oneself or others is academic fraud.

- Abuse of Library Privileges

  Depriving others of equal access to library materials constitutes a violation of academic integrity. This includes sequestering library materials for the use of an individual or group, refusal to respond to recall notices, and the removal or attempt to remove library materials from any university library without authorization.

- Abuse of Shared Electronic Media

  Depriving others of equal access to shared electronic media used for academic purposes constitutes a violation of academic integrity. This includes actions that result in the damage or sabotage of campus computer systems.

Counseling and Psychological Services

Counseling and Psychological Services (CAPS) is a great source of support for issues of sadness, anxiety, loneliness, college adjustment, relationship struggles, and others not requiring medical intervention. CAPS offers online workshop series open to all students; consultations and referrals; and extensive website resources. In addition, CAPS All Hours line can be contacted by calling (855) 531-0761 or students can use the peer-led Crisis Text line by texting HOME to 741741. CAPS also

offers remote individual and group teletherapy to students residing within California. (State regulations prevent provision of therapy across state lines.) The student may choose to talk either by video or telephone and can engage in Single Session Therapy (SST), brief ongoing therapy, or group therapy. There are no fees for services. Please call (415) 422-6352 to make an appointment. Visit the CAPs website for more details. Students seeking off campus mental health services can also receive information and support from Case Management (part of the Office of the Dean of Students); visit the Dean of Students' website for further information.

Title IX

The Title IX Office seeks to stop, remedy, and prevent occurrences of sex and gender-based discrimination, sexual harassment, and sexual violence. The University has a Policy on Nondiscrimination based on Sex and Gender, Sexual Harassment and Sexual Misconduct. If you have experienced any of these behaviors, we encourage you to report the incident. If you report these behaviors to any staff or faculty member, they must notify the USF Title IX Coordinator.

Students who wish to report any sexual misconduct should use the online mandatory reporting form, or contact the Title IX Office directly. Other reporting options are available by visiting the Title IX website: https://myusf.usfca.edu/title-ix/reporting. The Title IX Office is located in Lone Mountain Room 145.

As an employee at USF, and your Professor, I am a mandatory reporter, meaning I have to share any instances of sexual harassment or sexual violence shared with me or that become known to me. I will have to share this information, including names and any details known, to the Title IX Office to connect you with resources. If you would like more information about the resources available, you can ask me at any time this semester. You do not need to tell me why you are asking to get help for a friend, another student, or yourself.

Confidential Resources for Reporting Sexual Misconduct

- Students may speak to someone confidentially which will not generate a report to the Title IX Office by contacting Counseling and Psychological Services at (415) 422-6352 during M-F 9-4pm, or speaking to a clergy member in University Ministry at (415) 422-4463.
- If you need to speak to a mental health clinician immediately, please **call the CAPS 24/7 All Hours Line at 855-531-0761** (available daily, including weekends and holidays, and accepts international calls), Public Safety (415-422-2911), 911, the Suicide Hotline (dial 988), or go to your nearest emergency room
- For off-campus resources, and local Bay Area organizations: https://myusf.usfca.edu/title-ix/resources

Learning, Writing, and Speaking Centers

The University of San Francisco offers academic assistance to all students through The Learning Center, The Writing Center, and The Speaking Center. Services are available at no additional cost to USF students and include subject-specific tutoring, writing assistance, and communications-related support. The Learning Center also provides opportunities for academic skill development, through one-on-one academic skills coaching, group workshops, and online resources.The Learning, Writing, and Speaking Centers are located on the Lower Level of Gleeson Library. Please contact them at (415) 422-6713 for further assistance or visit the LWSC [website](#) to make an appointment.

Communication

All course communications, like all other USF communications, will be sent to your USF official email address. You are therefore strongly encouraged to monitor that email account.

Gleeson Library

Looking for help with a research paper or project? Set up a consultation with a Librarian or get 24/7 research help [online.](#)

Netiquette

What is Netiquette?

Simply stated, it's network etiquette -- that is, the etiquette of cyberspace. And "etiquette" means "the forms required by good breeding or prescribed by authority to be required in social or official life." In other words, Netiquette is a set of rules for behaving properly online.

Netiquette General Policy

When communicating and participating online, please remember that others cannot hear your voice or see your face. Please keep the following behaviors in mind:

- Be respectful of other participants, their time (be brief), their bandwidth (few attachments/signatures), and their opinions
- Avoid using all caps, may be read as SHOUTING \item Keep your comments constructive
- Keep subject lines clear
- Spelling and grammar do count; proofread your writing
- Be coherent and succinct
- Acronyms may not be understood: "aok"
- Check the most recent comment/email before replying to an earlier one

Additional USF Resources

USF Food Pantry

The USF Food Pantry is an intermediate, short-term solution for any registered USF student to receive food and toiletry resources. Students are invited to stop by the pantry located on the first floor of Gleeson Library in the Atrium, and take the items that they need. Items are available on a first-come, first-serve basis until our supply is depleted. You will be asked to check-in via QR code before entering the pantry. For more information and the current schedule, visit the [USF food pantry website](). If you have further questions, please contact the Pantry Coordinator at [usfpantry@usfca.edu]() or 415-422-4099 (during business hours Monday thru Friday from 9:00am - 5:00pm). You can find out about additional food security resources through the [USF food insecurity resource page]() and the [CalFresh resources site]().