Python Programming for Data Analysis Section 01

CS 22B

Spring 2024   3 Unit(s)   01/24/2024 to 05/13/2024   Modified 01/23/2024

🕐 Course Information

Instructor:	Aarohi Chopra
Email:	aarohi.chopra@sjsu.edu
Class Room, Day, Time, and Date:	Clark Hall 111 Monday and Wednesday 9:00 AM -10:15 AM PST Jan 24, 2023 - May 13, 2023
Prerequisites:	CS22A with a grade of C- or better, or consent of the instructor/bioinformatics advisor.

Lecture

Monday, Wednesday, 9:00 AM to 10:15 AM, Clark Hall 111

Class and Office Hour Links *Subject to Change*:

Days and Times:	Link: TBA

Classroom	Monday and Wednesday 9:00 AM -10:15 AM PST Clark Hall 111	The lectures are in person, zoom meetings are set up in case of emergencies.
Group Office Hours	Monday 5:00 PM – 6:00 PM PST	Group office hours are held on the days homework is due. They are held on Discord and students are welcome to ask homework questions, discuss among themselves or just listen for reference.
Individual Office Hours (20 min slots)	Friday 5:00 PM – 6:00 PM PST	Individual office hours are appointment-based and use a live session via Zoom: - Earliest: 2 weeks beforehand - Latest: 2 days beforehand

💻 Course Description and Requisites

Hands-on Python programming skills for data analysis. Skills include finding a solution for a given problem and casting it as an algorithm, translating an algorithm to executable code, and debugging and testing code. Applications focus on computational techniques to understand, analyze, and visualize data.

Prerequisite(s): CS22A with a grade of "C-" or better, or consent of the instructor; Allowed Majors: Data Science, Biology (all) or Chemistry (all).

Letter Graded

✳ Classroom Protocols

Classroom Protocols and Etiquettes:

- **Attendance:** Strongly recommended and encouraged
  - **Be Punctual**
  - **Mute(Online):** Unless you are speaking, keep your microphone on mute. *Mute upon entry.*
  - The video does not need to be on. Strongly recommend and encourage video to be on during individual office hours.
    - If your video is on, be **mindful of background distractions**

- - If there are distractions, use an appropriate and professional virtual background that is NOT objectively offensive or demeaning.
  - **Stay on top of coursework:** Students are responsible for their knowledge and any course-related work.
  - **Follow the rules of netiquette:** Be respectful.
  - **Zoom recordings of the lectures(if any):** Posted by the end of the day. Email me if they are not.
    - You are only allowed to view it. You do not have permission to share the records or ANY course materials with someone who is not in this class.
    - These are protected by the instructor's copyright
  - **Accessibility:** Any student who needs accommodations or assistive technology due to a disability should work with the Accessible Education Center (AEC), and the instructor.
- Emails are responded to within a day or two depending on the amount. **Discord is another resource to reach out for small questions. Formal requests like delayed submissions, issues with projects, or changing dates should always be sent via email.**

COVID Requirements

Students are required to follow the University guidelines regarding COVID policies.

- If you are feeling sick, please stay at home. Please take a COVID test to ensure you do not have COVID.
- If you have COVID or are exposed, please, ensure you quarantine and stay at home.
- Everyone will read and acknowledge: January 2022 [CoS COVID-19 TrainingLinks to an external site. (https://drive.google.com/drive/folders/1Vmp39U9-CNpbwRobtZsGIZPTgRwV_Nh6)](https://drive.google.com/drive/folders/1Vmp39U9-CNpbwRobtZsGIZPTgRwV_Nh6) and [SJSU Phase Adapt PlanLinks to an external site. (https://www.sjsu.edu/healthadvisories/sjsu-adapt/phases/index.php)](https://www.sjsu.edu/healthadvisories/sjsu-adapt/phases/index.php).

All students registered for a College of Science (CoS) class with an in-person component must view the [CoS COVID-19 TrainingLinks to an external site. (https://drive.google.com/drive/folders/1Vmp39U9-CNpbwRobtZsGIZPTgRwV_Nh6)](https://drive.google.com/drive/folders/1Vmp39U9-CNpbwRobtZsGIZPTgRwV_Nh6) slides and the [SJSU Phased Adapt PlanLinks to an external site. (https://www.sjsu.edu/healthadvisories/sjsu-adapt/phases/index.php)](https://www.sjsu.edu/healthadvisories/sjsu-adapt/phases/index.php) website and acknowledge reading them according to their instructor's directions. By working together to follow these county and SJSU safety practices, we can keep our college safer. Students who do not follow COVID-19 Safety practice(s) outlined in the training, the SJSU Phased Adapt Plan, or instructions from their instructors, TAs, or CoS Safety Staff may be dismissed from CoS buildings, facilities, or field sites. Please review this training as needed throughout the semester, as updates will be implemented as changes occur (and posted to the same links).

Technology Requirements

Students are required to have an electronic device (laptop, desktop, or tablet) with a camera and built-in microphone. [SJSU has a free equipment loan program available for studentsLinks to an external site. (http://www.sjsu.edu/equipmentcheckout)](http://www.sjsu.edu/equipmentcheckout). Students are responsible for ensuring that they have access to

reliable Wi-Fi during tests. If students are unable to have reliable Wi-Fi, they must inform the instructor, as soon as possible or at the latest one week before the test date to determine an alternative. See Learn Anywhere website for current Wi-Fi options on campus.

Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

Course Goals

Course Description:

Learning hands-on Python programming skills.

Skills include:

- casting a problem as an algorithm
- translating an algorithm to executable code
- debugging and testing code

Applications focus on computational techniques to understand, analyze, and visualize data. This course is very heavy on programming if not entirely.

Course Format:

- Canvas Learning Management System is your main source for information: https://sjsu.instructure.com
  - All course material will be posted on Canvas.
  - You are responsible for checking Canvas regularly for any updates.
- The class will be mostly spent in lecture mode with participation.
- Written assessments and a project will be used to measure student learning.
- Lectures will be conducted until May 13 (Subject to Change).

Course Learning Outcomes (CLOs)

Course Learning Outcome (CLO)

Upon successful completion of this course, you will be able to

1. Write programs using various data types and basic techniques such as function calls, loops, and conditionals.
2. Use and manipulate several built-in data structures such as lists, arrays, and dictionaries, including nested data structures.
3. Break a medium-sized problem down into smaller parts and solve each sub-problem individually.

4. Test and debug programs.
5. Use objects and associated methods provided by the programming language.
6. Learn about sorting algorithms and complexities.
7. Implement objects and associated methods.
8. Write recursive functions. (Optional lecture)

📘 Course Materials

Python Programming Environment:

We will be using Google Colab ([https://colab.research.google.com/Links to an external site. (https://colab.research.google.com/)](https://colab.research.google.com/)) with Chrome or any supported web browser: and program in Python within Jupyter Notebook. There is no additional software installation is required.

If students want local software, Jupyter Notebook is recommended.

📝 Course Requirements and Assignments

Important notes

1. By enrolling and attending the classes you assure that you are fully aware of and completely agree with the syllabus and the guidelines.

2. Try to include your name, initials, or any identifying features in any assignments that you submit online or offline as in cases of regarding or cross-checking it makes it easier to trace back your submissions.

3. Link to academic calendar: https://www.sjsu.edu/provost/docs/Academic_Calendar-AY2023-24.pdf

✔ Grading Information

Grading Information:

Grading calculation will be based on the following:

- Final Exam   25%
- Hands-On   20%
- Participation   5%
- Midterm 1   15%
- Midterm 2   15%
- Project   20%

Late Submission: No late submission for the project, midterms, or final exam.

However, lab reports/hands-on per student might be accepted late under certain circumstances. Late submissions need to be handed in within a week and will be graded with 10% off for each day's extension. The student should let the professor know before the assignment submission about their delay only then

will the assignment be considered for late submission. If a student informs about their missing submission after the due date they will not be allowed to submit it or receive credit.

Exams: You must submit only your own work only. Copying and any other forms of cheating will not be tolerated and will result in a failing grade (F) for the course and be reported to the department. If copying and any other forms of cheating are done on any type of assessment (midterm and final), this will be combined with other disciplinary actions from the university.

Plagiarism: Any kind of plagiarism including online resources, chegg, chatGPT and more will be dealt with utmost seriousness. You may be allowed to use it in some occasions but any work without citing the used resources will be considered cheating and will be punished.

Grading Scale:

Percentage Range	Letter Grade	Percentage Range	Letter Grade
97.0% − 100%	A plus	72.0% − 76.99%	C
93.0% − 96.99%	A	70.0% − 71.99%	C minus
90.0% − 92.99%	A minus	67.0% − 69.99%	D plus
87.0% − 89.99%	B plus	62.0% − 66.99%	D
82.0% − 86.99%	B	60.0% − 61.99%	D minus
80.0% − 81.99%	B minus	<60.0%	F
77.0% − 79.99%	C plus		

1. **Final Exam − 25%:**

- Contact me if you cannot make it at least 3 weeks beforehand.

2. **Hands-on − 20%:**
   - Help you understand the material and increase your skills.
   - You are welcome to work with each other but copying code isn't allowed. Collaboration may include discussing ideas, building logic, and verbal code skeletons.
   - Only accepted through Canvas.

- Do not email it to the grader or professor.

3. **Participation – 5%:**
   - **Questions and quizzes** will be given in the class at random and students are supposed to collaborate and attempt to answer those during class time.
   - Participation assignments will be given which are to be submitted before the end of the day.
   - Need to be present for all lectures.
   - These assignments will be graded based on participation and not correctness.

4. **Midterm 1 and 2 – 30% (15% each):** Contact me if you cannot make it to the midterm at least 2 weeks in advance.

5. **Project – 20%:**
   1. Will include a paper, your group's code, peer evaluations, and a 10-min presentation
   2. Each group contains 2 students.

🏛 University Policies

Per [University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf)](http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the [Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php)](https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

📅 Course Schedule

Course Schedule – Tentative and Subject to Change:

Week	Date	Topic	Assignment Due
1	1/24	Syllabus. Introductions. Course Expectations. Google Collab. Recap of CS22A. Work on Lecture 1 Participation Question 1 open	Assigned on 1/24: Pre-Reqs check Due on 1/26: Day 1 Participation Recap
2	1/29	Recap Q For Loops Slides for "For loop" + finish for loop portion of lecture 1	Due on 1/26: Pre-Reqs check

2	1/31	Practice Questions [Lab day]	Assigned on 1/31: Hands-On 1
3	2/5	Recap	Recap
3	2/7	Finish Recap. Start Intro to Pandas.	Due on 2/7: Hands-on 1
4	2/12	Intro to Pandas.	Assigned on 2/12: Hands-On 2(Pandas)
4	2/14	Data Visualization.	
5	2/19	Data Visualization.	Due on 2/19: Hands-on 2 (Pandas) Assigned on 2/19: Hands-On 3 (Visualization)
5	2/21	Dictionaries. Start Complex Data Structures.	Due on 2/21: Hands-On 3 Visualization
6	2/26	Complex Data Structures.	Assigned on 2/26: Hands-On 4 Complex DS
6	2/28	List comprehension 1	
7	3/4	Functional Programming	Due on 3/4: Hands-On 4
7	3/6	Midterm Review Practice Midterm	

8	3/11	Midterm 1	
8	3/13	Explanation of Midterm 1. Project Explanation Functional Programming Finish Up and Review Any Material.	Project Explanation
9	3/18	Functional Programming	Assigned on 3/18: Hands-On 5 (Functional Programming)
9	3/20	Group Assignment[Lab day]	**Project Proposal Due**
10	3/25	Object-Oriented Programming.	Due on 3/18: Hands-On 5 (Functional Programming)
10	3/27	Object-Oriented Programming.	Assigned on: 2/27 Hands-On 6 (Functional Programming + OOP diagrams)
	04/01-04/05	Spring Break	
11	4/8	Object-Oriented Programming. Hands-on stuff	
11	4/10	Generators	Due on 4/3: Hands-On 6 (Functional Programming + OOP diagrams) Assigned on: 4/3 Hands-On 7 (Generators)
12	4/8	Exception Handling.	

12	4/15	Exception Handling + Generators Hands-on.	Due on: 4/10 Hands-On 7 Generators Assigned on 4/10: Hands-on 8(Exceptions)
13	4/17	Sorting	
13	4/22	Midterm 2 review	Due on: 4/10 Hands-On 8(Exceptions)
14	4/24	Midterm 2	
15	4/29	Sorting	Assigned on 4/29: Hands-on 9(Exceptions)
16	5/1	Sorting + questions	Due on: 4/10 Hands-On 9(Sorting)
16	5/6	**Presentation**	Material due on 5th May
17	5/8	**Presentation**	
18	5/13	Final review	
	TBA	**FINAL EXAM: 7:15-9:30 AM**	