Advanced Programming with Python Section 07

CS 122

Fall 2024   3 Unit(s)   08/21/2024 to 12/09/2024   Modified 08/20/2024

👤 Contact Information

Instructor: Dr. Di An

Email: di.an@sjsu.edu

I welcome you to contact me outside of class either by email or by joining me in one of my in-person or virtual office hours. If your schedule prevents you from joining one of my scheduled office hours, please get in touch and I will be happy to schedule a time slot to meet with you.

Office Hours: Monday 9:30AM-10:30AM by zoom. https://sjsu.zoom.us/j/9054874499

or request by email.

🖥 Course Description and Requisites

Advanced features of the Python programming language with emphasis on programming practice. Course involves substantial programming projects in Python.

Prerequisite(s): CS 146 (with a grade of "C-" or better). Computer Science, Applied and Computational Math, or Software Engineering majors only.

Letter Graded

✳ Classroom Protocols

Classroom Learning Environment:

This course will follow a hands-on learning approach where we will work through coding exercises together in class. Please come to class with a charged laptop ready to dive into some code!

Code of conduct:

Short version: In this course, I aim to foster a positive learning environment - no form of harassment will be tolerated, including verbal comments and images that exclude people based on gender, socio-economic status, or appearance.

The full code of conduct is provided on the Canvas course space for this course.

Plagiarism and cheating

Just like a written essay, using somebody's computer code without proper acknowledgement is considered plagiarism. Homework problems should be based entirely on students' own work. Students can (and are encouraged to) discuss general coding techniques and problem solving strategies for homework problems but this should never include copying (whether by typing, file transfer or cutting and pasting), looking at somebody else's code on their computer to get help, or allowing copying to occur. Students found violating this policy once will receive zero credit for those problems. Continued violations will result in disciplinary action. If you have any questions about this policy, please don't hesitate to ask for clarification.

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 Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

1. Design, implement and test readable, efficient programs that take advantage of Python built-in capabilities and follow Python best practices.

2. Understand implementation differences and performance tradeoffs associated with various Python data structures.

3. Develop Python applications using the modules and packages available in the Python standard library.

4. Develop Python applications using third party libraries.

5. Design, implement and test Python programs that include a graphical user interface, data analysis and visualization, web data

   extraction and web applications.

📘 Course Materials

This course will utilize The Quick Python Book by Naomi Cedar (4th Edition, ISBN 9781633436336). The Quick Python Book, which I uploaded to Canvas, Please do not share with others, as copyright is sensitive.

The Quick Python Book

Author: Naomi Cedar
Edition: 4th
ISBN: 9781633436336

✔ Grading Information

Category	Percent of Total Grade
Quizzes	10
Homework	40
Midterm	20
Project	30

Incomplete work: Points will be deducted for incomplete question responses and solutions that are partially functional. Consult individual assignments for details of point allocation for each problem.

Late assignments: No late homework will be accepted.

Academic Honesty: You may only submit your own work for all quizzes, assignments, exams, and projects. Copying and any other form of cheating will not be tolerated and will result in a failing grade (F) for the course and disciplinary consequences from the university.

Makeup Exams: Makeup exams will only be given in cases of illness (documented by a doctor) or in documentable, extreme emergency cases.

Grading Scale	Percentage
A+	A+>97%
A	93%<A<96.99%
A-	90%<A-<92.99%
B+	87%<B+<89.99%
B	83%<B<86.99%

B-	80%<B-<82.99%
C+	77%<C+<79.99%
C	73%<C<76.99%
C-	70%<C-<72.99%
D+	67%<D+<69.99%
D	60%<D<66.99%
F	F<59.99%

🏛 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

This course will meet twice per week during the Fall semester as follows:

Monday and Wednesday, in-person in Duncan Hall 450, 7:30 PM - 8:45 PM

Week	Day	Date	Lecture	Details	Homework	Quiz
1	Wed	08/21/24	Course Introduction & Setup	Overview of course, syllabus review, setting up Python environment, IDEs		
2	Mon	08/26/24	Advanced Python Syntax	Deep dive into lists, sets, dictionaries, and tuples; Time complexity analysis.		
2	Wed	08/28/24	Functional Programming in Python I	Introduction to functions, lambda, map, filter, reduce, and decorators.	HW 1 Due 09/01	Quiz 1

3	Mon	09/02/24	Labor Day			
3	Wed	09/04/24	Functional Programming II	Higher-order functions, recursion, and immutability in Python.		
4	Mon	09/09/24	Object-Oriented Programming I	Classes, objects, inheritance, and polymorphism.		Quiz 2
4	Wed	09/11/24	Object-Oriented Programming II	Advanced OOP: Encapsulation, abstraction, and design patterns in Python.	HW 2 Due 09/15	
5	Mon	09/16/24	Regular Expressions	Introduction to regex, pattern matching, and practical applications.		
5	Wed	09/18/24	Error Handling & Exceptions	Exception hierarchy, custom exceptions, context managers, and best practices.		Quiz 3
6	Mon	09/23/24	Iterators & Generators	Understanding iterators, generators, and the yield keyword.		
6	Wed	09/25/24	Python Modules & Packages	Creating and using modules, packages, and the Python Package Index (PyPI)	HW 3 Due 09/29	
7	Mon	09/30/24	Working with Files	Reading/writing files, context management, CSV, JSON, and XML parsing		

7	Wed	10/02/24	Closures and Decorators	How to define closures, develop simple decorators, and define decorators with arguments.		Quiz 4
8	Mon	10/07/24	Multithreading & Multiprocessing	Concurrency in Python, threads, multiprocessing, and GIL.		
8	Wed	10/09/24	Asynchronous Programming	Using `asyncio` for asynchronous programming, coroutines, and event loops.	HW 4 Due 10/13	
9	Mon	10/14/24	Midterm Review			Quiz 5
9	Wed	10/16/24	Midterm			
10	Mon	10/21/24	Final Project meeting	Discuss the final projects		
10	Wed	10/23/24	Introduction to GUI Programming in Python	Using `Tkinter` for creating graphical user interfaces, event handling, and basic widgets.	HW 5 Due 10/27	
11	Mon	10/28/24	Introduction to NumPy	Basics of NumPy, working with arrays, and essential mathematical operations.		Quiz 6
11	Wed	10/30/24	Data Manipulation with Pandas	Introduction to Pandas, DataFrames, data manipulation, and basic operations.		

12	Mon	11/04/24	Data Visualization with Matplotlib	Basic & Advanced plotting techniques using Matplotlib; line plots, bar charts, and histograms.		
12	Wed	11/06/24	Memory Management in Python	Memory management techniques, garbage collection, techniques for memory profiling, and understanding deep vs shallow copy in Python. Optimizing Python code	HW 6 Due 11/03	
13	Mon	11/11/24	Veterans Day			
13	Wed	11/13/24	Web Development with Flask I	Introduction to Flask, routing, templates, and forms.		Quiz 7
14	Mon	11/18/24	Web Development with Flask II	Handling requests, sessions, and building a simple web application.		
14	Wed	11/20/24	RESTful APIs in Python	Designing and consuming REST APIs using Flask and Requests module.	HW 7 Due 11/24	
15	Mon	11/25/24	Advanced RESTful APIs	Authentication, versioning, and deployment of APIs.		Quiz 8
15	Wed	11/27/24	Non-instructional Day			
16	Mon	12/02/24	Final project work time-1	Final project discussion and answer question		

16	Wed	12/04/24	Final project work time-2	Final project discussion and answer question	HW 8 Due to 12/08	
Final	Wed	12/11/24	Final Project Presentations		Final Report and Slides due 12/13/24	