CS122: ADVANCED PROGRAMMING IN PYTHON

Section 01, Fall 2021
San José State University
Department of Computer Science

COURSE AND CONTACTINFORMATION

- **Instructor:** Wendy Lee Ph.D.
- **Email:** wendy.lee@sjsu.edu
- **Class Days/Time:** Tue & Thu 9:00 am - 10:15 am (Pacific Standard Time)
- **Office Hours:** Schedule appointment @ www.sjsu.edu/people/wendy.lee/
  Wed 10:00 am – 11:00 am, Fri 8:00 am - 9:00 am
- **Classroom:** Online via Zoom (Zoom link is posted on Canvas)
- **Prerequisites:** CS 146 with a grade of C- or better / instructor consent

COURSE FORMAT

- This course will be conducted in an online mode: Lectures and Labs will take place during live Zoom meetings. Zoom lectures will be recorded and posted in the Canvas Learning Management System at https://sjsu.instructure.com.
- Class time (live session) will be spent either in “lecture” mode or in “lab” mode, explained in “Class Protocol” in this document.
- Course materials such as syllabus, handouts, notes, hands-on exercises, projects, quizzes, exams, etc. can be found on Canvas Learning Management System. You are responsible for regularly checking with the Canvas messaging system to learn of any updates.
- Written and oral assessments will be used to measure student learning in this course.

COURSE DESCRIPTION

Advanced features of the Python programming language with emphasis on programming practice. Programming projects include a graphical user interface, data analysis and visualization, web data extraction and web applications.

COURSE LEARNING OUTCOME (CLO)

Upon successful completion of this course, students will be familiar with the following concepts and will be able to apply them in appropriate situations:

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. Manipulate and analyze large datasets and handle missing or inconsistent values.
4. Design, implement and test Python programs for data analysis and visualization, web data extraction and database interactions.

RECOMMENDED TEXTS/READINGS

- *The Quick Python Book* (Third Edition) by Naomi Ceder ISBN: 9781617294037
- *Biological data exploration with Python, pandas and seaborn* by Martin Jones, 2020. ISBN-13: 979-8612757238
- Additional course readings, examples, exercises, etc. will be assigned and provided by the instructor.

PYTHON PROGRAMMING ENVIRONMENT

- Python 3.7 available at https://www.python.org/downloads/release/python-371/
- PyCharm Professional or Community Edition - recommended IDE
- Google Colab (https://colab.research.google.com/) with Chrome or any supported web browser

COURSE REQUIREMENTS AND ASSIGNMENTS

- **Quizzes (10%)**: Quizzes will take place on Tuesday at the beginning of class to assess students' knowledge on the course materials from the week before. A unique password will be provided for each quiz during lecture. Each quiz will expire at the end of Wednesday of that week. ***No make up quizzes will be given.***
- **Hands-on Assignments (40%)**: Hands-on assignments will be posted and must be submitted on Canvas. All assignments must be submitted by the posted due date to receive full credit. All work submitted on individual assignments must be your own. You may not share or copy code from fellow students or from the web. Infractions will

be detected and will lead to an automatic 0. If someone else copies your work, with or without your permission, you will be held responsible.

- **Midterms (MT) (20%)**: MT1 (10%): October 12, 2021, MT2 (10%) November 9, 2021. No make-up exams will be given if a student misses the midterm exam submission deadline (unless you have a legitimate excuse or other personal emergencies and can provide documented evidence).
- **Final Project & Presentation (20%)**: The final project is a group project. Each group consists of 2-3 students. Here are the key deliverables and due dates:
    - Team Formation: September 23, 2021.
    - Project proposal: October 7, 2021.
    - Progress Report: November 16, 2021.
    - Final Project Due: November 30, 2021.
    - Presentation: Each group gives a 10-minute, in-class presentation via Zoom on Nov 30 or Dec 2, 2021, during class time.
- **Final Exam (10%):** December 10, 2021, 07:15 - 9:30 PM

GRADING INFORMATION

Grading calculation will be based on the following:

- 10% Quizzes
- 40% Hands-on Assignments
- 20% Midterm I & II
- 20% Term Project
- 10% Final Exam

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

Late assignments: No late homework will be accepted. However, under exceptional circumstances, one problem set per student might be accepted late. It will need to be handed in prior to the following class meeting and will be graded with 30% off. Such an extension should be requested from the instructor.

Exams and any assignments: You may only submit your own work. Copying and any other form of cheating will not be tolerated and will result in a failing grade (F) for the course, as well as disciplinary consequences the university.

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

Grading Scale:

Point Range	Letter Grade	Point 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		

VIRTUAL CLASSROOM PROTOCOL

- **Live Session via Zoom**: Live Zoom meetings will be used as dual-purpose virtual classrooms. A meeting can be a regular lecture room, or it can be a computer laboratory for hands-on team exercises in break-out rooms.
- **Lecture Mode**: This is when Zoom is used as a virtual lecture room. You are expected to listen and follow the lecture. Be considerate to your classmates and follow the lecture. Keep your microphone muted except when speaking to the instructor. You may use the chat in Zoom to post questions during lecture.
- **Lab Mode**: Zoom break-out rooms will be use to group you into teams of three or more to work on hands-on lab exercises. Work collaboratively on the exercises and share your ideas and solutions with your classmates.
- **Attendance**: Live virtual class attendance is strongly encouraged. Follow the rules of netiquette. Be respectful. Dress appropriately if you are going to participate in the virtual classroom with the camera on.
- **Recording of Zoom Classes**: The instructor will record the live virtual classes using Zoom and the recordings will be shared in the Canvas course shell. If you do not wish to be identified in a class recording, please contact the instructor to arrange an "anonymous" option prior to class.
- **Zoom recordings and course materials**: You are allowed view the Zoom recordings for your own study purposes only. You may not record any course materials. You may not share any class recordings or course materials with someone who isn't enrolled in the without permission from the instructor. The lecture recordings and course materials are protected by copyright.
- **Accessibility**: If you need accommodations or assistive technology you should work with the Accessible Education Center (AEC) and the instructor.
- **Be Punctual**: Please arrive to the live sessions on time so that you benefit fully from the course experience and do not disturb classmates and the instructor while class is in session.
- **Stay on top of coursework**: You are responsible for knowing all material covered in lectures, assignments, quizzes, and course-related work.

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 students (https://sjsuequipment.getconnect2.com). 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 (https://www.sjsu.edu/learnanywhere/equipment/index.php) for current Wi-Fi options on campus.

UNIVERSITY POLICIES

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo

COURSE SCHEDULE

The course schedule is subject to change with fair notice. Changes will be announced on Canvas. Readings (QP - *The Quick Python Book*, BD - *Biological data exploration with Python, pandas and seaborn*)

Week	Date	Readings	Topics
1	8/19	Ch1 QP	Syllabus. Introductions. Course Expectations.
2	8/24	Ch6 QP	Strings
2	8/26	Ch5 & 7 QP	Lists, Tuples, Sets, Dictionaries
3	8/31	Ch8 QP	Control flow and comprehensions
3	9/2	Ch9 QP	Basic functions, lambda, generator functions, decorators
4	9/7	Ch16 QP	Regular Expressions
4	9/9	Ch13 & 14 QP	Working with files and Exceptions handling
5	9/14	Ch15 QP	Object-oriented programming
5	9/16	Ch19 QP	Using Python libraries
6	9/21	Ch2 & 3 BD	Intro to pandas, series and dataframe objects
6	9/23	Ch4 BD	Data exploration using pandas
7	9/28	Ch5 BD	Data exploration using pandas
7	9/30	Ch6 BD	Intro to Seaborn and
8	10/5	Ch7 BD	Plotting special types of scatter plots

Week	Date	Readings	Topics
8	**10/7**		**Project Proposal** Review
9	**10/12**		**Midterm I**
9	10/14	Ch9 BD	Categorical axes with seaborn
10	10/19	Ch12 BD	Grouping and Categorizing data in pandas
10	10/21	Ch13 BD	Binning and ordered categories
11	10/26	Ch14 BD	Reshaping data
11	10/28	Ch16 BD	Dealing with complicated or dirty data
12	11/2	Ch22.4 QP	Scraping web data
12	11/4	Ch23 QP	Working with Relational Database
13	**11/9**		**Midterm 2**
13	*11/11*		*Veteran's Day (Campus closed)*
14	**11/16**		**Project Progress Report** Web Development with Flask
14	11/18		Web Development with Flask
15	11/23		Review
15	*11/25*		*Thanksgiving holiday (Campus closed)*
16	**11/30**		**Project Due. Project Presentations**
16	**12/2**		**Project Presentations**
17	**12/8**		**Final Exam: 12:15 PM - 2:30 PM**

Important dates:

08/31/2021: Last Day to Drop a Class without a "W" grade
09/08/2021: Last Day to Add Courses for Fall 2021.