San José State University
Department of Computer Science
CS 22A Section 01, Fall 2022
Python Programming for Everyone

Course and Contact Information

Instructor:	Wendy Lee
Office Location:	MacQuarrie Hall 413
Email:	wendy.lee@sjsu.edu
Office Hours:	Monday 8-9 AM / Friday 8-9 AM (by appointment only)
Class Days/Time:	Tu/Th 9:00 - 10:15 AM
Classroom:	Duncan Hall 450
Prerequisites:	Course is not open to computer science majors or minors or software engineering majors. Either B4 ready or non-B4 ready with a corequisite support course.
GE/SJSU Studies Category:	B4

Course Description

Introduction to Python programming in interesting, relevant, and practical contexts for data science, such as data visualization, central tendency, hypothesis testing, sampling distributions, estimation, ANOVA, Chi-Squared Test, correlation, and regression. Basic programming skills are developed to explore and analyze data from multiple disciplines. Fundamental programming constructs: iteration, conditional statements, built-in data structures, input and output, and functions.

Course Format

This is an in-person class. Class time will be spent either in “lecture” mode or in “lab” mode. Students are required to bring your wireless laptop to each class.

Course Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on my faculty web page on Canvas Learning Management System course login website at http://sjsu.instructure.com. You are responsible for regularly checking with the messaging system through MySJSU at http://my.sjsu.edu to learn of any updates.

Course Goals

Provide students with the opportunity to learn and apply computer programming to solve real-world problems, exposing them to high-demand skills. Satisfies the GE area B4 requirement, except for Business, Psychology, and STEM-Ed majors.

GE Learning Outcomes (GELO)

Students will meet their 500 word count requirement with seven homework assignments, each averaging around 40 to 50 word count responses to word problems. Some explicit examples of these word problems are provided below under the appropriate GELO. The estimated word counts are listed as well.

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

GELO 1. Use mathematical methods to solve quantitative problems including those presented in verbal form.
GELO 2. Demonstrate the ability to use mathematics to solve real-life problems.
GELO 3. Arrive at conclusions based on numerical and graphical data.

Program Learning Outcomes (PLO) for BS Data Science

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

PLO 1: Analyze a complex problem involving large datasets and apply principles of computing and other relevant disciplines to identify solutions.

Course Learning Outcomes (CLO)

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

CLO 1: Explain fundamental programming constructs such as assignments, sequential operations, iterations, conditionals, and defining functions in Python.

CLO 2: Use basic mathematical techniques for solving quantitative problems.

CLO 3: Apply fundamental programming construct and mathematical concepts in solving real world problems.

CLO 4: Use Python libraries to explore and analyze data.

CLO 5: Interpret data visualization and summary statistics in the context of a particular problem.

Required Texts/Readings

- **Textbook:** Practical Statistics for Data Scientists (PSDS): 50+ Essential Concepts Using R and Python by Peter Bruce, Andrew Bruce, and Peter Gedeck ISBN-13: 978-1492072942 ISBN-10: 149207294X
- **Other Readings:** Additional course readings, examples, exercises, etc. will be assigned and provided by the instructor.

Pre-class Video Lessons: They can be accessed directly through Canvas. These are short videos (usually 1 to 3 minutes long) that present 1 to 2 ideas followed by a mini-quiz. These videos cover all the class topics.

Other technology requirements / equipment / material

Students will need to have either a personal laptop/desktop with Internet service or access to an on-campus computer lab. For the programming environment, we will be using Google Colab (https://colab.research.google.com/) with Chrome or any supported web browser.

Course Requirements and Assignments

The course will consist of pre-class video lectures, in-class lectures and hands-on exercises, homework, a term project, one midterm exam, and a final exam. All midterm and final exams are conducted in-person.

Pre-class video lectures: Students should watch the assigned pre-class video lectures and complete the quizzes within the videos.

In-class hands-on exercises: After each lecture, students will be assigned a group partner to complete an in-class hands-on exercise during class, and it must be turned in before the end of class through Canvas.

Homework

All homework will be completed online. The homework will reinforce and deepen the understanding of content discussed in lecture, and also serve as preparation for the in-class midterm exams. No late assignments 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.

Quizzes

Quizzes will be given during class to assess the level of understanding of the course materials.

Term Project

There will be a programming group project. Each group consists of two students. Information on the term project, including topics and deadlines, will be given later. The term project is due on the 15th week of the semester. Each group will give a 10-minute, in-class presentation (5 minutes per student), during class time.

Midterm Exam

There will be an in-class midterm exam. The midterm will be held in the 9th week of the semester. Success on the midterm exams will indicate a mastery of the associated materials. No make-up exams will be given unless proper documentation of an emergency is provided.

Final Examination

There will be a comprehensive final exam on a date and time to be determined.

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.

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

Academic Honesty: Students must only submit their 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, as well as disciplinary consequences from the university.

University Credit Hour Requirement

Success in this course is based on the expectation that you will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation, and studying. Plan on spending at least 7 hours per week outside of lecture time engaging with the course material.

Grading Information for GE

For Fulfillment of Area B4: this course must be passed with a C- or better as a CSU graduation requirement.

Grading Information:

- In-class hands-on exercises (20%)
- Homework (30%)
- Quizzes (10%)
- Project (20%)
- Midterm Exam (10%)
- Final Exam (10%)

Grade Scale:

A plus = 100 to 97.0 points
A = 96.9 to 93 points
A minus = 92.9 to 90.0 points
B plus = 89.9 to 87.0 points
B = 86.9 to 82.0 points
B minus = 81.9 to 80.0 points
C plus = 79.9 to 77.0 points
C = 76.9 to 72.0 points
C minus = 71.9 to 70.0 points
D plus = 69.9 to 67.0 points
D = 66.9 to 62.0 points
D minus = 61.9 to 60.0 points
F = 59.9 points or lower

Classroom Protocol

Students are expected to adhere to the Student Conduct Code found at http://www.sjsu.edu/studentconduct/ students/. Additionally, students should regularly attend lectures and labs (if applicable), treat instructors and peers with respect, and refrain from the use of cell phones during any classroom activities.

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/

COVID-19 and Monkeypox

Students registered for a College of Science (CoS) class with an in-person component should view the CoS COVID-19 and Monkeypox Training slides (https://drive.google.com/drive/folders/1Vmp39U9-CNpbwRobtZsGIZPTgRwV_Nh6) for updated CoS, SJSU, county, state and federal information and guidelines, and more information can be found on the SJSU Health Advisories website (https://www.sjsu.edu/healthadvisories/). By working together to follow these safety practices, we can keep our college safer. Failure to follow safety practice(s) outlined in the training, the SJSU Health Advisories website, or instructions from instructors, TAs or CoS Safety Staff may result in dismissal from CoS buildings, facilities or field sites. Updates will be implemented as changes occur (and posted to the same links).

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Course Schedule

The course schedule is subject to change with fair notice. Changes will be announced on Canvas.

PSDS - Textbook: Practical Statistics for Data Scientists, **ULs** - Udacity Video Lessons, **HW** - Homework

Wk	Date	Reading/ Video Assignment	HW	Topics
1	8/23, 8/25			Syllabus, Course Expectations, Introduction to Google Colab
2	8/30, 9/1	ULs: Intro to Statistical Research Method	HW1 due	Introduction to Python Programming Introduction to Statistical Research Process
3	9/6, 9/8	PSDS: Ch.1 p.7-13,29 ULs: Central Tendency		Dictionaries, Lists, and Sets Introduction to Pandas Dataframe and Series Central Tendency Loops and Conditional Statement
4	9/13, 9/15	PSDS: Ch.2 p.13-19 ULs: Variability & Standardizing	HW2 due	Measures of Variability
5	9/20, 9/22	PSDS: Ch.2 p.69-71 ULs: Normal Distribution		Normal Distribution and Standardized Scores Visualizing Data with Graphs
6	9/27, 9/29	PSDS: Ch.2 p.57-61 ULs: Sampling Distribution	HW3 due	Sampling Distribution and Standard Error
7	10/4, 10/6	PSDS: Ch.2 p.65-68 ULs: Estimation		Writing User-Defined Functions Estimation (Confidence Intervals) Margin of Error
8	10/11, 10/13	PSDS: Ch.3 p.93-96 ULs: Hypothesis Testing	HW4 due	Hypothesis Testing t-Tests to Compare Means
9	10/18, 10/20	PSDS: Ch.3 p.110-112 ULs: t-Tests		t-Tests to Compare Means **Midterm Exam**
10	10/25, 10/27	PSDS: Ch.3 p.118-121 ULs: One-way ANOVA		One-way ANOVA

11	11/1, 11/3	PSDS: Ch.3 p.123-124 ULs: Two-way ANOVA	HW5 due	Two-way ANOVA
12	11/8, 11/10	PSDS: Ch.1 p. 30-36 ULs: Correlation		Correlation
13	11/15, 11/17	PSDS: Ch.4 p. 141-145 ULs: Regression	HW6 due	Regression
14	11/22, **11/24 (No class)**	PSDS Ch.4 p. 146-150 ULs: Regression		Regression
15	11/29, 12/1	PSDS Ch.4 p. 124-127 ULs: Chi-Squared tests	HW7 due	Chi-Squared tests Project Presentations
16	12/6			Project Presentations
	12/14 (Wed) 7:15-9:30 AM			**Final Exam**