

Python for Everyone Section 01

CS 22A

Spring 2023 3 Unit(s) 01/25/2023 to 05/15/2023 Modified 01/27/2023

Classroom: MacQuarrie Hall 422

Schedule: TuTh 9:00AM - 10:15AM

Contact Information

Instructor:	Wendy Lee Ph.D.
Office:	MH 413
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Office Hours:	M/W 8-9am by appointment (https://calendly.com/wendy-lee-sjsu/spring-2023-office-hours)

Course Description and Requisites

Introduction to Python programming in interesting, relevant, and practical contexts. Programming skills are developed to solve problems in such fields as social and life sciences, mathematics, and business. Fundamental programming constructs: data structures and algorithms, iterations, and functions. Course is intended for students who have no prior programming experience.

GE Area(s): B4. Mathematics/Quantitative Reasoning

Note(s): A grade of C- (1.7) or better is required to satisfy GE Area B4.

Corequisite(s): CS 1022AS required for Math Enrollment Categories M-III and M-IV.

Letter Graded

* Classroom Protocols

Students are expected to adhere to the Student Conduct Code found at the [SJSU Student Conduct website](http://www.sjsu.edu/studentconduct/) (<http://www.sjsu.edu/studentconduct/>). 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.

- **Dual Role of MH 422:** Lecture/Lab MH 422 will be used as a dual-purpose room. It can be a regular lecture room, or it can be a computer laboratory for hands-on exercises.
- **Lecture Mode:** This is when MH 422 is used as a regular lecture room. Students are expected to listen and follow the lecture. Be considerate to your classmates and follow the lecture.
- **Lab Mode:** This is when MH 422 is used as a computer lab. Use your laptop computer. Work collaboratively on problems of the

Hands-On and share your ideas and solutions with your classmates.

- We shall alternate between the two modes. A typical class will begin with a lecture (Lecture Mode) followed by a hands-on (Lab Mode).
- Regular class attendance is highly recommended and strongly encouraged.
- Please arrive to class on time so that you benefit fully from the course experience and you do not disturb classmates and the instructor while class is in session.
- Students are responsible for knowing all materials covered in class lectures, readings, assignments, and other course-related work.
- Laptops, tablets, and other devices should only be used for course-related purposes.

Program Information

Welcome to this General Education course.

SJSU's General Education Program establishes a strong foundation of versatile skills, fosters curiosity about the world, promotes ethical judgment, and prepares students to engage and contribute responsibly and cooperatively in a multicultural, information-rich society. General education classes integrate areas of study and encourage progressively more complex and creative analysis, expression, and problem solving.

The General Education Program has three goals:

Goal 1: To develop students' core competencies for academic, personal, creative, and professional pursuits.

Goal 2: To enact the university's commitment to diversity, inclusion, and justice by ensuring that students have the knowledge and skills to serve and contribute to the well-being of local and global communities and the environment.

Goal 3: To offer students integrated, multidisciplinary, and innovative study in which they pose challenging questions, address complex issues, and develop cooperative and creative responses.

More information about the General Education Program Learning Outcomes (PLOs) can be found on the [GE website \(https://sjsu.edu/general-education/ge-requirements/overview/learning-outcomes.php\)](https://sjsu.edu/general-education/ge-requirements/overview/learning-outcomes.php).

Course Learning Outcomes (CLOs)

GE Learning Outcomes (GELO)

GE Area B4: Mathematics/Quantitative Reasoning

Area B4 courses develop students' abilities to reason quantitatively, practice computational skills, and explain and apply mathematical and/or quantitative reasoning concepts to solve problems at the college level. Completion of Area B4 with a grade of C- or better is a CSU graduation requirement.

GE Area B4 Learning Outcomes

Upon successful completion of an Area B4 course, students should be able to:

1. use mathematical methods to solve quantitative problems, including those presented in verbal form;
2. interpret and communicate quantitative information using language appropriate to the context and intended audience;
3. reason, model, draw conclusions, and make decisions based on numerical and graphical data; and
4. apply mathematical or quantitative reasoning concepts to solve real life problems.

Writing Practice: Students will write a minimum of 500 words in a language and style appropriate to the discipline.

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.

Course Materials

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 (a copy is provided in the Canvas course shell for your personal use)
- **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 idea followed by a mini-quiz. These videos cover all the class topics.

Other technology requirements / equipment / material

Students will need 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 \(https://colab.research.google.com/\)](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 the 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 before 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.

Course Policies

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. However, under exceptional circumstances, one problem set per student might be accepted late. It will need to be handed in before 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 emergencies.

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.

✓ Grading Information

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%)
- Term 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

COVID-19 and Monkeypox Information

Updated CoS, SJSU, county, state and federal information and guidelines can be found on the [SJSU Health Advisories website \(https://www.sjsu.edu/healthadvisories\)](https://www.sjsu.edu/healthadvisories). By working together to follow these safety practices, we can keep our college safer.

University Policies

Per [University Policy S16-9 \(http://www.sjsu.edu/senate/docs/S16-9.pdf\)](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 [Syllabus Information web page \(https://www.sjsu.edu/curriculum/courses/syllabus-info.php\)](https://www.sjsu.edu/curriculum/courses/syllabus-info.php) (<https://www.sjsu.edu/curriculum/courses/syllabus-info.php>). Make sure to visit this page to review and be aware of these university policies and resources.

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, VA - Video Assignment, HW - Homework

Week	Date	Reading/ Video Assignment	HW	Topics
1	1/26			Syllabus, Course Expectations, Introduction to Google Colab
2	1/31, 2/2		HW1 due	Introduction to Python Programming String manipulation
3	2/7, 2/9	VA: Intro to Statistical Research Method PSDS: Ch.1, p.7-13,29 VA: Central Tendency		Dictionaries, Lists, and Sets Introduction to Pandas Dataframe and Series
4	2/14, 2/16	PSDS: Ch.2, p.13-19 VA: Variability & Standardizing	HW2 due	Introduction to Statistical Research Process Central Tendency
5	2/21, 2/23	PSDS: Ch.2, p.69-71 VA: Normal Distribution		Measures of Variability Normal Distribution and Standardized Scores

6	2/28, 3/2	PSDS: Ch.2, p.57-61 VA: Sampling Distribution	HW3 due	Loops and Conditional Statement Visualizing Data with Graphs
7	3/7, 3/9			Sampling Distribution and Standard Error
8	3/14, 3/16	PSDS: Ch.2, p.65-68 VA: Estimation	HW4 due	Writing User-Defined Functions
9	3/21, 3/23			Estimation (Confidence Intervals) Margin of Error Midterm Exam
10	3/28, 3/30	Spring Break No Class PSDS: Ch.3, p.93-96 VA: Hypothesis Testing		
11	4/4, 4/6			Hypothesis Testing
12	4/11, 4/13	PSDS: Ch.3, p.110-112 VA: t-Tests	HW5 due	Midterm 1 Discussion t-Tests to Compare Means
13	4/18, 4/20	PSDS: Ch.3, p.118-121 VA: One-way ANOVA		t-Tests to Compare Means
14	4/25, 4/27	PSDS: Ch.1, p. 30-36 Ch.4, p. 141-150 VA: Correlation. Regression	HW6 due	One-way ANOVA
15	5/2, 5/4			Correlation & Regression
16	5/9, 5/11		HW 7 due	Project Report due 12/1 or 12/6 Project Presentations
17	Wednesday, May 17, 7:15-9:30 AM			Final Exam