

Python for Everyone Section 02

CS 22A

Spring 2023 3 Unit(s) 01/25/2023 to 05/15/2023 Modified 01/26/2023

Contact Information

Instructor: Professor Nada Attar

Email: nada.attar@sjsu.edu

Office Hours

Twice Per Week

Tuesday, Thursday, 11:30 AM to 12:30 PM, Zoom

<https://sjsu.zoom.us/j/86030605405?pwd=Qmhya3NhL0lXVWxUb0lPdHBjb0VqUT09>

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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 <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.

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 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.

Course Learning Outcomes (CLOs)

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.

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.

Course Materials

Practical Statistics for Data Scientists (PSDS): 50+ Essential Concepts Using R and Python

Author: Peter Bruce, Andrew Bruce, and Peter Gedeck
ISBN: ISBN-13: 978-1492072942 ISBN-10: 149207294X

Other Readings

Additional course readings, examples, exercises, etc. will be assigned and provided by the instructor.

Video Supplement Lessons

Udacity videos. You do NOT need to subscribe to Udacity's services to use these videos.

<https://classroom.udacity.com/courses/st095>. 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 (does not affect your grade). 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. We will be using Python 3.7 available at <https://www.python.org/downloads/release/python-371/>. 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

Course Requirements and Assignments

The course will consist of homework, a term project, two in-class midterm exams, and a final exam.

Homework

All homework will be completed online. There will be a corresponding homework assignment for each day of lecture, and each assignment will be weighted equally. Each assignment will be accessible for around one week. The homework will reinforce and deepen the understanding of content discussed in lecture, and 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.

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 12th week of the semester. Each group will give a 10-minute, in-class presentation (5 minutes per student), during class time.

Midterm Exams

There will be one in-class midterm exam. Success on the midterm exam 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.

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.

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

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

Grading Information for GE

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

Breakdown

Percentage	Grade

97 and above	A+
94-96	A
90 - 93	A-
87 - 89	B+
84 - 86	B
80 - 83	B-
77 - 79	C+
74 - 76	C
70 - 73	C-
67 - 69	D+
64-66	D
60-63	D-
59 and below	F

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

This schedule is subject to change with fair notice via the Canvas messaging system.

When	Topic	Notes
Week #1	Syllabus, Course Expectations, Python Interpreter, Introduction to Google Colab	
Week #2	Introduction to Python Programming, String manipulation	HW1 due
Week #3	Dictionaries, Lists, and Sets, Introduction to Pandas Dataframe and Series	Udacity: Introduction To Statistical Research Methods

When	Topic	Notes
Week #4	Introduction To Statistical Research Methods, Central Tendency	PSDS Ch.1 p.7-13,29 Udacity: Central Tendency HW2 due
Week #5	Measures of Variability and Standardized Scores	PSDS Ch.2 p.13-19 Udacity: Variability and Standardized Scores
Week #6	Loops and Conditional Statement, Normal Distribution, Visualize Data with Graphs	PSDS: Ch.2, p.69-71 VA: Normal Distribution HW3 due
Week #7	Sampling Distribution and Standard Error	PSDS Ch. 2 p.57-61 Udacity: Sampling Distribution
Week #8	Writing User-Defined Functions	HW4 due
Week #9	Estimation (Confidence Intervals), Margin of Error, Midterm Exam	PSDS Ch. 2 p.65-68 Udacity: Estimation.
Week #10	Spring Break	
Week #11	Hypothesis Testing	PSDS Ch. 3 p.93-96 Udacity: Hypothesis. Testing HW5 due
Week #12	t-Tests to Compare Means	PSDS Ch. 3 p.110-112 Udacity: t-Tests to Compare Means
Week #13	One-way ANOVA	PSDS Ch.3 p.118-121 Udacity: One-wy ANOVA HW6 due
Week #14	Correlation and Regression	PSDS Ch.1 p. 30-36 Udacity: Correlation, Regression
Week #15	Project Presentations	HW7 due
Week #16	Project Presentations	

When	Topic	Notes
Week #16 05/17/2023 9:45 AM - 12:00 PM	Final Exam	