

# Advanced Programming with Python Section 01

## CS 122

Spring 2024 3 Unit(s) 01/24/2024 to 05/13/2024 Modified 01/28/2024

### Contact Information

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**Instructor:** Wendy Lee Ph.D.

**Office Location:** MacQuarrie Hall 413

**Email:** wendy.lee@sjsu.edu

**Office Hours:** Tuesday/Wednesday 2:00-3:00 PM by appointment only:

<https://calendly.com/wendy-lee-sjsu/spring-2024-office-hours>

**Class Schedule:** Tuesday/Thursday 12:00 PM - 1:15 PM

### Course Description and Requisites

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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

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- **Dual Role of DH 416:** Lecture/Lab DH 416 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 DH 416 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 DH 416 is used as a computer lab. Students must bring their laptops to every class. Students are expected to work collaboratively on problems of the Hands-On and share their ideas and solutions with their classmates.

We shall alternate between the two modes. A typical class will begin with a lecture (Lecture Mode) and a hands-on (Lab Mode).

- Regular class attendance is strongly encouraged.
- Please arrive at 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.
- Please do not use mobile phones during class time. Laptops, tablets, and other devices should only be used for course-related purposes.

## Program Information

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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)

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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 utilize 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 and implement Python programs for data analysis and visualization, web development, and database interactions.

## Course Materials

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The following textbook will be made available in the course Canvas shell:

- *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

### Other Readings

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

## Python Programming Environment

- Python 3.7 or 3.8 available at <https://www.python.org/downloads/>
- Google Colab (<https://colab.research.google.com/>) with Chrome or any supported web browser
- IDE of your choice, such as PyCharm Community Edition

# ☰ Course Requirements and Assignments

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Success in this course is based on the expectation that students 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/studying, or course related activities.

1. **Quizzes (10%):** Quizzes will take place in class only to assess students' knowledge of the course materials from the week before. A unique password will be provided for each quiz during the lecture. *No make-up quizzes will be given.*
2. **Hands-on Assignments (20%):** 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/chatGPT. Infractions will be detected and will lead to an automatic failing grade for the course. If someone else copies your work, with or without your permission, you will be held responsible.
3. **Midterms (MT) (30%):** MT1 (15%) March 7th, 2024, MT2 (15%) April 18th, 2024. 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).
4. **Term Project & Presentation (20%):** The final project is a group project. Each group consists of 2 students. Here are the key deliverables and due dates:
  - Team Formation: February 22, 2024.
  - Project proposal: March 14, 2024.
  - Progress Report: April 15, 2024.
  - Final Project Due: May 7, 2022.
  - Presentation: Each group gives a 10-minute, in-class presentation on May 7 or May 9, 2024, during class time.
5. **Final Exam (20%):** Final Exam is on May 20, 2024, 9:45 AM - 12:00 PM. It is a comprehensive test, including topics covered at the beginning and throughout the course.

## ✓ Grading Information

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### Grading Information

- 10% Quizzes
- 20% Hands-on Assignments
- 30% Midterm I (15%) & Midterm II (15%)
- 20% Term Project
- 20% Final Exam

**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 graded with 30% off. Such an extension should be requested from the instructor.

**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:

| Grade   | Percentage     |
|---------|----------------|
| A plus  | 97.0 to 100%   |
| A       | 93.0 to 96.99% |
| A minus | 90.0 to 92.99% |
| B plus  | 87.0 to 89.99% |
| B       | 82.0 to 86.99% |
| B minus | 80.0 to 81.99  |
| C plus  | 77.0 to 79.99% |
| C       | 72.0 to 76.99% |
| C minus | 70.0 to 71.99% |
| D plus  | 67.0 to 69.99% |
| D       | 62.0 to 66.99  |
| D minus | 60.0 to 61.99% |
| F       | <60.0          |

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

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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    | 1/25 | Ch1 QP       | Syllabus. Introductions. Course Expectations.            |
| 2    | 1/30 | Ch6 QP       | Strings  |
| 2    | 2/1  | Ch5 & 7 QP   | Lists, Tuples, Sets, Dictionaries                        |
| 3    | 2/6  | Ch8 QP       | Control flow and comprehensions                          |
| 3    | 2/8  | Ch9 QP       | Basic functions, lambda, generator functions, decorators |
| 4    | 2/13 | Ch16 QP      | Regular Expressions                                      |
| 4    | 2/15 | Ch13 & 14 QP | Working with files and Exceptions handling               |
| 5    | 2/20 | Ch15 QP      | Object-oriented programming                              |
| 5    | 2/22 | Ch11 QP      | Distributing Python applications                         |
| 6    | 3/5  |              | <b>Midterm #1 Review</b>                                 |
| 6    | 3/7  |              | <b>Midterm #1</b>  |

|    |      |                                |   |
|----|------|--------------------------------|---|
| 7  | 3/12 | Ch2 & 3 BD                     | Intro to pandas, series and dataframe objects                             |
| 7  | 3/14 | Ch4 & 5 BD                     | Data exploration using pandas   |
| 8  | 3/19 | Ch6 BD                         | Intro to Seaborn  |
| 8  | 3/21 | Ch7 & 9 BD                     | Plotting special types of scatter plots and categorical axes with seaborn |
| 9  | 3/26 | Ch12 & 13<br>BD                | Grouping and Categorizing data in pandas                                  |
| 9  | 3/28 | Ch14 & 16<br>BD<br><br>Ch24 QP | Reshaping data and handling complicated or dirty data                     |
| 10 | 4/2  | <i>Spring Break - no class</i> |   |
| 10 | 4/4  | <i>Spring Break - no class</i> |   |
| 11 | 4/9  | Ch23 QP                        | Working with Relational Database  |
| 11 | 4/11 | Ch23 QP                        | Make database handling easier with an Object-Relational Mapping (ORM)     |
| 12 | 4/16 |                                | <b>Midterm #2 Review</b>  |
| 12 | 4/18 |                                | <b>Midterm #2</b>   |
| 13 | 4/23 |                                | Web Development with Flask  |
| 13 | 4/25 |                                | Web Development with Flask  |
| 14 | 4/30 |                                | Deploying web app to the cloud  |
| 14 | 5/2  |                                | <b>Final Review</b>   |

|    |      |  |                                    |
|----|------|--|------------------------------------|
| 15 | 5/7  |  | Project Due. Project Presentations |
| 15 | 5/9  |  | Project Presentations              |
| 17 | 5/20 |  | Final Exam: 9:45 AM - 12:00 AM     |