

Introduction to Python Programming for Social Science Applications

Fall 2023

Lecture Time: Wednesday 3:00 - 5:30

Office Hours: Thursday 3:00 - 5:30

Instructor: Professor Emma Hogan (she/her)

Instructor bio: Emma Hogan is a Computer Science and Engineering doctoral student at the University of California, San Diego (UCSD). She is passionate about expanding quality educational access in prisons, and conducted research for her undergraduate thesis on the ideal role of technology in correctional education. Her current research in the Computing Education Research Lab at UCSD includes studying best practices for teaching computing in a correctional setting, incorporating culturally relevant pedagogy in college-level computing courses, evaluating emerging pedagogies such as live coding, addressing concerns of students entering introductory computing courses. Upon finishing her Ph.D., Emma looks forward to continuing to research and practice teaching college-level computer science in correctional settings.

Course Description

In this course, students will learn the basics of programming in Python to solve real-world problems. More specifically, students will learn how to use computer programming to harness the computational power of a computer for data analysis, and other social science applications. Throughout the course, students will complete interactive in-class exercises and programming assignments to help master the basics of Python coding and explore its social science applications.

This course is designed for students with no prior programming experience or technology expertise: just a willingness to learn.

Textbook

Think Python: How to Think Like a Computer Scientist, 2nd Edition (2015), Allen Downey

Learning Objectives (How student learning and grading will be assessed)

Upon successful completion of the course, students should be able to:

- Translate a real-world problem into a Python program
- Analyze data using a Python program
- Read a computational problem and formulate an algorithm to solve that problem
- Describe the functionality of a program that you or someone else has written
- Write Python programs using variables, functions, conditional statements, and loops
- Store data in a program using data structures like lists and dictionaries
- Debug Python programs that you or someone else has written
- Describe ways in which computer science plays a role in society and in other scientific disciplines

Assignment Details

In-Class Quizzes (10%)

There will be eight total weekly quizzes administered at the beginning of lecture (every week except for the first week, and the weeks of the midterm and final exams). Quizzes will be done **individually**, and may include code writing and/or conceptual questions.

For all quizzes, you will be able to submit corrections **once** (according to this course's specific Corrections Procedure) to **earn up to 50% of the points back that you missed on the first attempt**.

Labs (10%)

Labs will be completed in groups at the end of lecture. The purpose of labs is to get hands-on, collaborative experience working with the material just gone over in lecture while the instructor is present and readily available to answer questions as needed. I will aim to make the labs brief enough so that they can be almost or completely finished during the allotted time in lecture, but **they will be collected at the beginning of the following lecture. Labs will be graded for completion, not correctness.**

Problem Sets (15%)

Each week, Problem Sets will be distributed during lecture. Students will have the choice of completing Problem Sets **either individually or in small groups**. The purpose of practice problem sets is to test conceptual understanding of the course material at a deeper level than writing code. For example, these problems may ask you to identify errors in a snippet of code, trace through a snippet of code, or explain in plain-English what a piece of code does.

Programming Assignments (25%)

You will complete **four** Programming Assignments throughout the quarter, where you will be writing Python code to accomplish the given task(s). In the Programming Assignments, you will be challenged to apply your knowledge from the course to real-world applications in other social science disciplines. **These assignments can be either handwritten on paper, or submitted as a typed Word document on Canvas.**

These assignments will increase in both difficulty and size throughout the quarter: in the beginning of the quarter, you can expect to write a few lines of code or one method that accomplishes a smaller task or part of a big task; by the end of the semester, you will be writing full Python programs that will involve processing and analyzing data to answer real-world problems!

Expect that partial credit will be generously awarded for partially correct code and small mistakes. Assignments will be graded using detailed rubrics, similar to other classes you may have taken with me in the past.

Code Reviews (10%)

One question on each of the programming assignments will be an open-ended programming completed **individually**. As programming assignments will be due every **two** weeks, we will use the Discussion Board feature on Canvas as a place for “Code Reviews,” where you will give and receive feedback from peers on a draft of your code for the individual question at the halfway point of the assignment duration. So, approximately every other week a new programming assignment will be distributed during lecture on Wednesday, which would be due **two weeks** from the day it is distributed. However, **one week** before the assignment is due, you will be required to post a draft of your code for the individual programming question on a Canvas discussion board. You will then have **two days** to complete Code Reviews for **at least 3** of your peers: you will comment on their discussion board post, identifying *and explaining* any errors that you see, and highlighting parts of the code you believe to be correct and explaining why.

While your post of your code draft will be graded for **completeness**, not correctness, Code Reviews will be graded **based on the quality of your feedback to peers**.

Weekly Reflections (5%)

Weekly Reflection assignments are designed to help me understand students’ experiences more generally in the course. I plan to use this information to directly improve/change my plan for the course or course policies if necessary, as well as improving courses I teach in the future. Weekly Reflections will be completed independently at any point during the week, and turned in at the beginning of each lecture.

Exams (25%)

There will be **two exams in this course: a midterm and a final exam**. The exams will both take place during lecture times, with the final exam in the final week of the quarter. More details will be provided as the exams approach.

The final exam will be **cumulative** and will cover all topics discussed in the course. **If your final exam score (in percentage) is higher than your midterm score, then your midterm score will be replaced by your final exam score!**

Late and Incomplete Assignments

Students are expected to maintain academic standards that reflect the highest level of honesty and integrity, including turning in your assignments on time.

All weekly assignments will be collected at the start of lectures, which occur once per week on Monday. Therefore, if you do not have an assignment ready on time, the next opportunity to turn in the assignment will be the lecture of the following week (one week late) for a late penalty of one letter grade, or 10%.

If circumstances out of your control result in not being able to complete an assignment on time, you must speak to the instructor for the possibility of an exception. Communicate with the instructor as early as possible if meeting a deadline will be an issue.

As a rule of thumb, **start early**. I will be much more understanding/possibly willing to grant exceptions if you can show me that you had already started the assignment, as opposed to saving it until the last minute.

As with all courses, if you foresee a conflict in schedules, work with your Instructor/TAs to get the assignment in early or to identify an alternative assignment. This must be resolved with your Instructor/TAs well in advance of any due dates.

Academic Integrity

Students are intellectually and morally obliged to pursue their course of studies with honesty and integrity. Therefore, in preparing and submitting materials for courses and in taking examinations, a student shall not yield to cheating or plagiarism.

Plagiarism shall be defined as the act of incorporating ideas, words, or specific substance of another, whether purchased, borrowed, or otherwise obtained, and submitting the same as one's own work to fulfill academic requirements without giving credit to the appropriate source. Plagiarism shall include but not be limited to (a) submitting work, either in part or in whole, completed by another; (b) omitting footnotes for ideas, statements, facts, or conclusions that belong to another; (c) omitting quotation marks when quoting directly from another, whether it be a paragraph, sentence, or part thereof; (d) close and lengthy paraphrasing of the writings of another; (e) submitting another person's artistic works, such as musical compositions, photographs, paintings, drawings, or sculptures; and (f) submitting as one's own work papers purchased from research companies.

UCI is an institution of learning, research, and scholarship that is strengthened by the existence of an environment of integrity. As members of the academic community, students are responsible for maintaining this environment, and subscribe to the practice of academic integrity and accept individual responsibility for their work and actions. Violations of academic integrity are unacceptable and will not be tolerated, because they devalue the teaching and learning experience for the entire community. Observing basic honesty in one's work, words, ideas, and actions is a principle to which all members of the community are required to subscribe.

In most cases, students violating academic integrity will get an "F" for the course, and in extreme cases they may even be expelled from the university. Please inspect [Academic Integrity Information for Students](#) for more details (located in the Canvas UCI Resource page, Files, Academic Integrity Policy and Academic Integrity Procedures). Examples of cheating are copying exams from other students, stealing exam keys from TA or instructor, or paying someone to take the exam for you. Please do not jeopardize your future careers by being so irresponsible. If you are unsure whether something you are planning on doing may be considered cheating please come and speak with me before doing it. "I didn't know that was cheating" will not be considered as an acceptable excuse.

Course Schedule/Calendar

Week #	Date	Topics	Pre-Class Reading	In-Class Quiz	Assignments Released	Assignments DUE
1	October 4th	Course Intro + Syllabus Basics of computers (CPU, Memory) Example: Hello World Variables and Values Data Types: Int, Float, String Arithmetic Operators String Operations Simple Memory Model	Chapters 1 & 2		PA1 Problem Set 1	
2	October 11th	Functions Using Built-in Functions Getting Input from User Type Conversions Function Calls Defining New Functions Parameters and Arguments Flow of Execution	Chapter 3.1 - 3.7	Quiz 1	Lab 1	Code Review 1

3	October 18th	Variable Scope Stack Diagrams Logical Operators Boolean Logic Conditional Statements Tracing Code with Repetition	3.8 - 3.12, Chapter 5	Quiz 2	PA2 Problem Set 2	PA1 Problem Set 1
4	October 25th	Advanced Memory Diagrams Scope of Variables (Local vs Global) Call Stack Passing Parameters to Functions	Chapter 6	Quiz 3	Lab 2	Code Review 2
5	November 1st	Midterm Exam				PA2 Problem Set 2
6	November 8th	For loops and range Loops with variable updates Range basics Functions with for loops While loop basics Infinite loops	Chapter 7	Quiz 4	PA3 Problem Set 3	
7	November 15th	Strings and Lists Indexing Built-in Methods Using Python Documentation	Chapters 8 & 10	Quiz 5	Lab 3	Code Review 3
8	November 22nd	Dictionary Basics Modifying a Dictionary Dictionary Methods	Chapter 11	Quiz 6	PA4 Problem Set 4	PA3 Problem Set 3
9	November 29th	Data Processing Importing data from CSV files to variables	14.1 - 14.5	Quiz 7	Lab 4	Code Review 4
10	December 6th	TBD (Flexible day for adapting to any extra time needed on a topic or unforeseen events)		Quiz 8		PA4 Problem Set 4
11	December ?	Final Exam				

Expectations (of students, of instructor)

What I expect from you:

- Treat classmates and me with respect
- Be open to opinions other than your own
- Give your best effort to participating in lecture and independent assignments
- Practice compassion for yourselves and your classmates when the course gets challenging
- Communicate with the instructor as any issues arise

What you can expect from me:

- Treat students with respect
- Be open to opinions other than my own
- Give my best effort to every lecture and develop assignments that are meaningful work
- Practice compassion for myself and students when the course gets challenging
- Make myself available as much as possible for questions and additional assistance

Grading Breakdown

Note that the following categories are color coded as follows, according to the Collaboration Policy (see next section for detailed explanation): **Yellow** = Individual, **Blue** = Group Work option and/or graded for completion, **Green** = some of both.

10%	In-Class Quizzes
10%	Labs
15%	Problem Sets
25%	Programming Assignments
10%	Code Reviews
5%	Weekly Reflections
25%	Exams (Midterm: 10%; Final Exam: 15%)

Collaboration Policy

As shown in this grading breakdown, approximately 50% of your final grade in the class will be from assignments (or parts of assignments) completed in a group, and/or only for completion. Specifically, the Labs (10%), Problem Sets (15%), and **part** of each Programming Assignment (25%) can be completed in groups as you choose. In addition, Weekly Reflection assignments (5%) are graded for completeness.

The rest of your grade will be based on **individual** knowledge of the material. This includes In-Class Quizzes (10%), Code Reviews (10%), Exams (25%), as well as **one question on every programming assignment**. The individual question on the programming assignment will be open-ended, and should not match that of anyone else in the course. However, through the Code Reviews, you will be able to get peer feedback on your code prior to your graded submission.

Resubmissions

You will be allowed **unlimited resubmissions** of all programming assignments. However, after the first submission, you will only be able to **earn back at most 50% of the points that you missed in the first attempt**. For example, if you earned 74% of the points on your original submission of a programming assignment, you could resubmit as many times as you want in order to earn a maximum of 87% on the assignment.

However, I am excited to offer this quarter the opportunity to submit typed drafts of **any code** to be run (by myself or support staff), and have the resulting output returned to you **once per day!**

Deadlines for Problem Sets are **final**. There will not be any resubmissions of Problem Sets allowed past the due date, with the exception of personal extenuating circumstances (communicate with me as soon as possible).

Inclusive Excellence

Student Services and Resources and Campus Ally and Awareness Resources are provided by the Office of Inclusive Excellence. UCI has taken a university-wide approach to equity, diversity and inclusion. This charge is about dismantling the systemic barriers of racism and discrimination that have too long been the norm in higher learning and our broader communities. The Office of Inclusive Excellence serves the campus priorities and is committed to a transformative, whole university effort grounded in our values: expect equity, support diversity, practice inclusion and honor free speech. (Ref from UCI Office of Inclusive Excellence)

In this course, people of all ethnicities, genders and gender identities, religions, ages, sexual orientations, disabilities, socioeconomic backgrounds, regions, and nationalities are encouraged to express their unique identities and perspectives. This is meant to be an inclusive space where everyone can experience the feeling of mastering something difficult, and feel supported throughout their learning experience. Mutual respect is to be practiced between the instructor and students, and amongst students. Please communicate any specific needs or concerns to the instructor as you see fit at any point in the quarter.

Diversity Statement

The University of California, Irvine, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy, physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access, and treatment in University programs and activities.

Disability and Accessibility Accommodations

The University of California, Irvine, is committed to providing a barrier-free environment for learning and an electronic environment that is accessible to everyone, including individuals with disabilities. If you have a disability and feel you need accommodations in this program or a course, please contact the LIFTED program coordinator and inquire about the Disability Services Center (DSC). DSC approved accommodations will be provided for students who present a Faculty Notification Letter from the DSC.

Privacy Practices in This Course

This course is a community built on trust; as a learning community, we are collectively responsible for upholding privacy protections. In order to create a community built on trust and the most effective learning experience, our interactions, discussions, and course activities must remain private and free from external intrusion. We have obligations to each other to preserve privacy and cultivate fearless inquiry. We respect the individual dignity of all and will refrain from actions that diminish others' ability to learn.

As your instructor, I am committed to protecting your privacy by only using university-approved course technologies and adhering to the Family Educational Rights and Privacy Act (FERPA), Campus Privacy Office guidelines and CDCR guidelines and regulations. This includes using your educational data only as allowed by FERPA (for example for legitimate educational purposes such as submitting your final grades to the registrar's office). Communications in this course are subject to the UC Principles of Community (located in Canvas UCI Resource page, Files, Principles of Community - UCOP) and the Electronic Communications Policy (ECP) (located in Canvas UCI Resource page, Files, Electronic Communications Policy - UC), to the extent that these do not violate any CDCR regulations.

Please note the following privacy practices for our course:

- I will be recording every lecture in this course. These lectures will only be viewable by students in the class (and the appropriate CDCR officials). These recordings will be used by students as review tools.
- Course materials (videos, assignments, problem sets, etc.) are for use in this course only. You may not share with students outside of this course or post them for public commentary without my written permission. Unauthorized sharing, storage or uploading of exam questions, test answers, summaries of exams, or any other course material is prohibited.

- You may work on group projects with other students or be asked to review or respond to their work. Other materials and activities may provoke debate, argument, or spirited discussion; some of us may volunteer sensitive personal information. Do not share others' personal information, including class dialogue or performance, on sensitive topics outside of our course community. Student work, discussion posts, and all other forms of student information related to this course should be handled with respect and remain within interactions of this course. You may publicly post your own work, provided it does not violate academic dishonesty policies, CDCR regulations, or show responses to assessments; public posting of group work requires consent from all group members. Research conducted as part of a class is subject to UC research policies and may include sensitive information. Students may not share research information without permission from the instructor.
- Sharing private information about our course community (including discussions, activities, presentations, student work, etc.) with others for the purpose of inviting external attention, intrusion, ridicule, or harassment is an egregious breach of trust. Violating these principles will be handled according to UCI's Honor code.

Student Code of Conduct for this course

Students will be subject to the University's policies and regulations, including without limitation the University's Code of Student Conduct. In short, "the University therefore strives to foster an environment in which all are included, all are given an equal opportunity to learn and explore, in which differences as well as commonalities are celebrated, and in which dissenting viewpoints are not only tolerated but encouraged. Acts of hatred and other intolerant conduct, as well as acts of discrimination that demean our differences, are antithetical to the values of the University and serve to undermine its purpose." Students are expected to adhere to this guiding principle in all aspects of the course. The full policy can be made available upon request.

Students are also expected to follow the University's Academic Integrity policy. In short, no student shall engage in any activity that involves attempting to receive a grade by means other than their personal honest effort and shall not aid another student who is attempting to do so. For example, copying work from another source without appropriate attribution would be considered a violation of academic integrity. Violating the Academic Integrity Policy is unacceptable, devaluing the teaching and learning experience for the entire community. It is essential that all members of the University practice academic integrity and accept individual responsibility for their work and actions. All students are encouraged to notify instructors about observed incidents of Academic Integrity Policy Violations. Instructors should take reasonable steps to preserve the confidentiality of students making such reports. The full policy can be made available upon request.

To the extent University's policies or regulations conflict with CDCR policies or regulations governing the same subject matter, the more restrictive policy or regulation shall govern.

Copyrights

This course is provided by The University of California, which has policies regarding copyright. Materials used in connection with this course may be subject to copyright protection. The course content was created to be used in compliance with the TEACH Act. 17 U.S.C. §110(2).

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If you do so, you may be subject to student conduct proceedings under the Code of Student Conduct, Section 102.23.

Similarly, you own the copyright in your original papers and exam essays. If I am interested in posting your answers or papers on the course web site, I will ask for your written permission.