

Course Information
Introduction to Programming for Data Science
Math 10, Fall 2021

About the class. The goal of this course is to introduce programming in Python, with an emphasis on some of the tools that are most relevant to data science. The primary *learning outcomes* for Math 10 are that students will be able to:

- select appropriate data types (both built-in Python types as well as types defined in external libraries) when performing computations;
- manipulate structured data using NumPy and pandas;
- visualize significant aspects of datasets using Altair and Seaborn;
- run machine learning algorithms using scikit-learn;
- improve the performance of various machine learning algorithms by adjusting parameters;
- evaluate simple neural networks by hand, and complex neural networks using Keras;
- apply tools from unfamiliar Python libraries after reading their documentation;
- create an interactive, data-focused web app using Streamlit.

Instructor. Christopher Davis, davisjc@uci.edu, RH 440J

Teaching Assistant. Yasmeen Baki, ybaki@uci.edu, RH 410V

Lecture. MWF 12:00-12:50pm, ALP 3600

Discussion section. TuTh 10:00-10:50am, ALP 3600

Office Hours. The instructor and TA will hold weekly office hours, probably in a computer lab. See our course website for details.

Learning Assistants. We have two Learning Assistants:

- Xingshuo Xiao
- Chupeng Zheng

They will attend lecture on Mondays and Wednesdays and will in particular assist with the in-class worksheets.

Textbook. There is no official textbook for this course. There may be occasional assigned or optional readings, linked on our course homepage.

Class Website. <https://canvas.eee.uci.edu/courses/39211>

Prerequisites/Corequisites. Math 2D, Math 3A, and Math 9. Of these, the most useful would be familiarity with basic programming concepts like for loops and if statements, variable assignment, data types, writing functions, understanding code step-by-step,

Software requirements. We will use a variety of free tools in Math 10. You will need access to a computer with Python 3.8, and on which you can install Python packages. One option for this is to download the free software, Anaconda Individual Edition. You will also need to create a free account on Streamlit Cloud (community package) and on GitHub (the main GitHub page, not the UC Irvine GitHub).

Anaconda is available on the lab computers. If you want to use the software on your personal computer, that's great, but you're responsible for getting it installed; the course instructor probably cannot help with installation. We can help you use the software once it is successfully installed.

Other possibilities which we may use: Deepnote; Google Colab; Kaggle; Respondus Lockdown Browser (including the webcam component); CamScanner (or a similar app for converting multiple handwritten pages to a PDF).

Grade breakdown. The final grade will be calculated using the following weights:

- 25% In-class Quizzes;
- 25% Final Project;
- 20% Homework;
- 20% Midterm;
- 5% In-class Worksheets;
- 5% Video Quizzes.

For students who find they cannot attend class regularly, there will be an option to remove the In-class Worksheets portion of the grade and to reweight the Midterm to 25%. (This replacement will be done automatically, if it helps your grade. You do not need to request it.) The class will not be curved in a traditional sense. However, if the midterm proves to be more difficult than anticipated, the scores may be adjusted upwards. A total course grade of 93-100 will correspond to A, 90-93 will be A-, 87-90 will be B+, ..., 60-63 will be D-, and 0-59 will be F. A grade of A+ will be given only in special circumstances.

In-class Quizzes. There will be one in-class quiz most weeks in discussion section on Thursdays, starting in Week 1 (not in Week 0). During holiday weeks, the quiz may be moved to discussion section on Tuesdays. These in-class quizzes will be closed book and closed computer. The in-class quizzes will be designed and graded using a method called *specifications grading*. We will not explicitly drop a low quiz score, but there will be an opportunity to make up missed points on these quizzes, probably by completing a similar quiz online using Respondus Lockdown Browser (and webcam). More information will be available on our course website.

Final project. There is a final project for this class in which you will design a web app using the Python package Streamlit. The final version of this project is due at 3:30pm on Monday of Finals week. The final projects will be done individually. One goal of this project (and a reason to have it be an individual project instead of a group project) is to have something you can easily share with prospective employers, for example if applying for an internship. We hope to share the final projects through a page on the math department website (you can contact the instructor if you would prefer your project not be shared).

Homework. There will be one homework assignment due most weeks before lecture on Fridays. Your lowest homework score will be dropped. You are allowed to complete the homework individually or in a group of up to three students.

Midterm. There will be a 50-minute in-class midterm during discussion section on Thursday, November 4th (Week 6). You will be allowed to hand-write notes on a notecard and use that during the exam. The notecard will be distributed during an earlier class (you are not allowed to bring your own). Aside from the note card, the exam will be closed book and closed computer.

In-class Worksheets. The best way to learn programming is to write programs. Many lectures and discussion will involve some lecture as well as some time for you to complete coding worksheets. We hope that you will attend every class, but we understand that is not always feasible. Satisfactory completion of at least half of the in-class worksheets will be enough to earn full credit on this component. These worksheets will be graded for effort, not for correctness. There is also an option to replace this entire portion of the grade with a more heavily-weighted midterm exam.

Video quizzes. Some course content will be delivered via asynchronous videos. (Exactly how much material is delivered in lecture, versus how much is delivered in videos, will not be finalized until after the class starts.) Most of the videos will be accompanied by a short online quiz. These video quizzes are meant to keep you “up to date” with the class. They are open note, open computer, etc, and they can be retaken at least once each.

Final exam. There is no final exam for this class, but see the final project description above.

Makeup exams and assignments. A makeup midterm will be offered only in the case of a documented emergency.

Waitlist. Students on the waitlist for Math 10 are expected to complete assignments by the same deadlines as the officially enrolled students. No special accommodations will be made for students who join the class late.

Academic integrity. Following the UCI academic integrity policy is a requirement to pass this class. Please see this website for more information on that policy: <https://aisc.uci.edu/>

Throughout the course, and especially in the course project, if you use code from another source, it must be clearly referenced. In the course project, if your idea comes from another source (for example, if the idea for your project is modeled after an idea you saw somewhere else), you must clearly acknowledge the original source, both in the source code and in the published project.

Your e-mail address. Announcements to the class will be sent via e-mail to your official UCI email address. It is your responsibility to check this e-mail address regularly. We hope the class will run smoothly, but the last year+ has required many last-minute changes.

Ed Discussion. Ed Discussion is a replacement for Piazza. Both are online question-and-answer forums. Ed Discussion can be used for asking for clarification on material, getting help with homework, checking logistical details about the class, finding classmates to work with. It should not be used for requesting extensions, requesting changes to the course, etc. For those sorts of accommodations, please contact the professor directly.

From the Campus. When physically present in a classroom, other instructional space, or any other space owned or controlled by UCI, all students and all employees (faculty and staff) must comply with COVID-19 related UCI executive directives and guidance. If you would like to request a reasonable accommodation related to the coronavirus or for any other reason to facilitate your participation in this course, please contact the UCI Disability Services Center (DSC).