

ECE 3 – Python Programming for Science & Engineering

Syllabus – Fall 2023

Lectures MW 3:30 PM – 4:45 PM Location: [TD-W 1701](#)

Labs

M 5:00 – 6:50 PM Zihu Wang
Tu 5:00 – 6:50 PM Yuxuan Yin
Tu 7:00 – 8:50 PM Karthik Somayaji
W 7:00 – 8:50 PM Jin Lee
Th 5:00 – 6:50 PM Arghavan Zibaie
Th 7:00 – 8:50 PM Aaditya Prakash Kattekola Location: [ESB 1003](#)

Staff

Instructors

[Nina Miolane](#) ninamiolane@ucsb.edu (Principal Instructor)
[Daniel Kunin](#) kunin@ucsb.edu
[David Klindt](#) davidklindt@ucsb.edu
[Bongjin Koo](#) bongjinkoo@ucsb.edu

Staff office hours (OH): M 9:00-10:00 AM held on Zoom. Zoom room is given in the slack workspace.

No OH the first week of class.

TAs

TA office hours (OH): held in the ECE TA Offices in Trailer 699, Room 103, located in front of Harold Frank Hall. No OH the first week of class.

Arghavan Zibaie Zibaie@ucsb.edu

OH : Tu 10:00 - 11:00 AM

Zihu Wang zihu_wang@ucsb.edu

OH: Tu 4:45 - 5:45 PM

Jin Lee hojin@ucsb.edu

OH: W 11:00 AM - 12:00 PM

Karthik Somayaji karthi@ucsb.edu

OH: W 12:00 - 1 PM

Yuxuan Yin y_yin@ucsb.edu

OH: Th 4:00 5:00 PM

Aaditya Prakash Kattekola aadityaprakash@ucsb.edu

OH: Th 5:30 - 6:30 PM

Contacting staff

Questions. Please ask questions about class reading, lectures, and homework by posting online on Slack. Other students probably have the same question as you, so it will be helpful for everyone to see the responses. It is also the quickest way to get an answer. The office hours are another opportunity to ask your questions. Please avoid using emails to ask questions.

Admin. For administrative inquiries, please only email the instructor. Keep all emails short and to-the-point, use UCSB email, and use ECE 3 in the subject line. Avoid email attachments (e.g. doc and pdf files) if possible.

Feedback. We welcome your feedback regarding the course at any point. Please feel free to email us directly and use ECE 3 in the subject line. Alternatively, you can leave anonymous feedback for the course staff by placing an anonymous note in Nina Miolane's mailbox at Harold Frank Hall.

Overview

This course represents a comprehensive foundation for Python programming in science and engineering. The lectures will present concepts from programming, linear algebra operations, statistics, machine learning and optimization in Python.

Students will actively engage with the technical materials with interactive course materials and hands-on sessions during the labs. The materials will be motivated by real-world datasets and scenarios ranging from brain imaging to housing market analytics.

This course is aimed to be:

- Active: The classroom experience should be more like a conversation than a one-directional transmission of information.
- Evidence-based: Frequent assessments will provide the instructors with ongoing information about student learning so that we can base the progression of the course on data rather than subjective impressions.

The goal of this course is to provide an understanding of the essential concepts and “big ideas” of Python programming for science and engineering, as well as the skills to employ these concepts on real data to solve authentic real-world problems.

Prerequisites: Students should have a solid understanding of high school mathematics, specifically algebra and general calculus.

Outline

Unit 01: Welcome to Python

Unit 02: Computing with Data in Python

Unit 03: Summarizing Data in Python

Unit 04: Predicting from Data with Machine Learning in Python

Attendance

Lectures. Students are required to attend all the lectures. Students cannot enroll in other UCSB courses whose schedule is conflicting with ECE 3 schedule. If a student cannot attend all ECE 3 lectures, please drop this class.

Labs. Each student will participate in a weekly two-hour long lab session with a TA. Students are required to attend all of their lab sessions. Please do not switch your registered sections otherwise we will not be able to confirm your attendance. The material in lab sessions is complementary to the lectures and is not meant as a substitute, and will also help you with the programming-based HW assignments. If a student cannot attend all ECE 3 labs, please drop this class.

Exam. Unless you have accommodations as determined by the university and approved by the instructor, you must take the exams at the date, time and location they are scheduled. Please check your course schedule and make sure that you have no

conflicts with these exams. There will be no makeup exams. If you miss an exam, you will receive an F. If a student cannot attend all ECE 3 exams, please drop this class.

Exception: Emergency. If you miss a lecture, lab, or exam due to an emergency, you should contact the instructor as soon as possible via email. Be prepared to bring official, written proof of a serious medical or other emergency that will be reported to UCSB.

Exception: Covid-19. If you are feeling ill or suspect you may have been exposed to someone who is ill, please stay home. Let the instructor and/or your TA know within 24 hours, and we will make arrangements for you.

Resources

Textbooks

The class goes over concepts from the textbooks:

- Unit 01 [Think Python](#) by Downey.
- Unit 02-03: [Introduction to Applied Linear Algebra](#) by Boyd & Vandenberghe.
- Unit 04: [Intro to Statistical Learning](#) by James, Witten, Hastie, Tibshirani, Taylor.

The textbooks are freely available online.

The following textbooks are considered supplemental to classes:

- Schaum's Outlines of Linear Algebra, by Seymour Lipschutz and Marc Lipson.
- Introduction to Linear Algebra by Gilbert Strang, 5th Ed.
- Introduction to Matrix Computations, by Margot Gerritsen.

We will not cover all topics in the books. We will cover a few topics not in the books.

Software

We use:

- Python version 3.9 or higher as our programming language,
- Jupyter notebooks to run Python interactively in a web browser.

Download Anaconda which will install everything you need to run Python 3.9+ and Jupyter notebooks:

- Anaconda: <https://www.anaconda.com/download>

The TAs will demo the setup process during the labs.

Slack Workspace

Join ECE 3 slack workspace with your @ucsb.edu email address via this link:

https://join.slack.com/t/ucsbece3/shared_invite/zt-23pozmy0z-_82sKHl0~WXROMCKntJRBA

Make it a habit to check Slack several times a week. Check for announcements, reading material, HW assignments, see if you can answer your classmates' questions yourself.

We use Slack to allow you to get help efficiently from both your classmates and the instructors. Please post your questions about the course material and course logistics to Slack so that everyone can benefit from the answer. We also highly encourage you to answer your classmates' questions whenever possible – you will get extra practice with the material and receive feedback from the course staff about your answers.

Please do not use Slack to post outright solutions to homework problems. You can, of course, discuss the exercises and ways to solve the problems

GitHub <https://github.com/bioshape-lab/ece3>

The slides will be posted after each lecture on GitHub. You can download them in html or pdf format. Alternatively, you can directly run the code from the slides using the Binder link provided on this GitHub repository.

Datacamp <https://www.datacamp.com/>

We use Datacamp to provide hands-on learning with Python. Some of your homework will be through Datacamp.

In order to connect to the class on Datacamp, [follow this link:](https://www.datacamp.com/groups/shared_links/13783fd5e7e02a5f3e1185233e44c3aede98a661aa929e57ad42ea907157b856)
https://www.datacamp.com/groups/shared_links/13783fd5e7e02a5f3e1185233e44c3aede98a661aa929e57ad42ea907157b856
and connect with your @ucsb.edu email address.

Grading

Your grade will be determined as follows:

- Datacamp HW: 15%
- Homeworks: 40%
- Final: 40%
- Constructive Participation: 5%
- Extra credit: up to +18% total

Unless otherwise stated, you can use any published resource you wish to complete any assessment in class or at home (textbook, Internet, etc).

The grade scale will be curved so that approximately 1/3 of the students receive an A/A-, 1/3 receive a B+/B/B-, and 1/3 receive a C+ or below. This will only be adjusted in the students favor: if, for example, more than 1/3 of the students master the material at an A level, then more than 1/3 of the students will receive As.

A+ grades and F grades. A+ grades may be awarded to the very best performing students in the class. The cutoff for A+ grades will be determined at the end of the course at the discretion of the instructor. If a student misses a homework or an exam, the student will receive an F. If a student cannot attend all ECE 3 exams, please drop this class.

Homework

Homework is posted on Slack every Thursday at 11:59 pm PST. There is no homework for the last week. They are due at 11:59 pm PST on Thursday, the week after they are posted. Start working on the homework problems as soon as they are posted, and allow adequate time to complete them.

Your lowest homework score will be weighted by 50% in the calculation of your overall homework grade.

There is no makeup homework. Late homework will not be graded. If a homework is submitted late, the student will receive a F. There will be no exception to this rule.

Plots are often important display items to answer homework questions. Please provide accurate, clear, and labeled graphics with readable fonts.

Exams

- There is no midterm exam for this class.
- Final exam: Friday, December 15, 2023 12:00 PM - 3:00 PM
 - o Location: To be assigned during the quarter.








If you are late for the final exam, you will not be given extra time. If you miss the final exam, you will receive an F grade. There is no makeup final exam. If you cannot attend the final exam, drop this class.

Constructive participation in class, labs, Slack and GitHub

Students will receive credits for interacting in class and during labs, for asking pertinent questions or giving answers. On Slack, students who provide frequent, high-quality answers will receive credit on their final course grades.

Extra credits

Students will be offered extra credit for submitting corrections or suggestions to the slides or to any of the course materials (up to + 5%). Students will be offered extra credit for submitting extra Datacamp assignments.

| TITLE | ASSIGNED TO | STATUS | DUE DATE TYPE | EXPIRES AT |
|--|--------------|--------|---------------|-------------------|
| Deadlines | | | | |
|  Introduction to Python Course | Organization | Active | Fixed | Oct 12, 23:59 PDT |
|  Introduction to Data Visualization with Matplotlib Course | Organization | Active | Fixed | Oct 19, 23:59 PDT |
|  Intermediate Python Course | Organization | Active | Fixed | Oct 26, 23:59 PDT |
| Optional (Extra-Credits) | | | | |
|  Introduction to Statistics in Python Course | Organization | Active | Fixed | Nov 2, 23:59 PDT |
|  Investigating Netflix Movies and Guest Stars in The Office Project | Organization | Active | Fixed | Nov 6, 23:59 PST |
|  Predicting Credit Card Approvals Project | Organization | Active | Fixed | Nov 20, 23:59 PST |
|  Dr. Semmelweis and the Discovery of Handwashing Project | Organization | Active | Fixed | Dec 4, 23:59 PST |

Grade disputes

Students must wait 24 hours after receiving a grade before they can dispute it, after which disputes must be received within 7 days of receipt of the grade. Grade disputes must be submitted to the TAs and the instructor by email.

As for homework, please read the relevant solutions and review the relevant course material prior to sending a request and specify (1) the part(s) of the homework that should be regraded and (2) reasons for regrading. The course staff will typically regrade the entirety of any homework for which any regrade is requested and the resulting score may be higher or lower than the original one. Please allow up to two weeks to

receive the complete regrading reports. There will be no homework grade changes after the final exam date.

Code of conduct

You are expected to treat the course staff and your classmates with courtesy and respect. This class should be a harassment-free learning experience for everyone regardless of gender, gender identity, and expression, sexual orientation, disability, physical appearance, body size, race, age, or religion. Harassment of any form will not be tolerated.

Reporting. If someone makes you or anyone else feel unsafe or unwelcome, please report it as soon as possible to the course staff. If you are not comfortable approaching the course staff, you may also contact the UCSB Well-being office:
<https://wellbeing.ucsb.edu/>.

This course affirms people of all gender expressions and gender identities. If you prefer to be called a different name than what is indicated on the class roster, please let us know. Feel free to correct us on your preferred gender pronoun. If you have any questions or concerns, please do not hesitate to contact us via email, using ECE 3 in the subject line.

Academic Honesty. Cooperation has a limit! You should not share your code or answers directly with other students. Doing so does not help them; it just sets them up for trouble on exams. Feel free to discuss the problems with others beforehand, but not the solutions. Please complete your own work and keep it to yourself. Penalties for cheating are severe — they range from a zero grade for the assignment or exam up to dismissal from the University, for a second offense. Rather than copying someone else's work, ask for help. You are not alone in this course! We are here to help you succeed. If you invest the time to learn the material and complete the projects, you will not need to copy any answers.

Thank you and best wishes for the new Academic Year! ☺