UC SANTA BARBARA
Bren School of Environmental Science & Management

EDS 220: Working with Environmental Datasets

(4 units, Fall 2025)

Course Website: https://meds-eds-220.github.io/MEDS-eds-220-course/
Course Listing: https://bren.ucsb.edu/courses/eds-220

💻 Class

Tuesday and Thursday 9:30 - 10:45
@ Bren Hall, 4016.

📓 Discussion Sections

Friday 10:30 - 11:50
@ Bren Hall 3022.

🍎 Instructor

Carmen Galaz García (she/her/hers)
E-mail: c_galazgarcia@ucsb.edu
Student hours:
Thursday 2 pm - 3 pm @ Bren Hall 4424
Best way to contact: e-mail / Slack

🍏 Co-Instructor

Annie Adams (she/her/hers)
E-mail: aradams@ucsb.edu
Student hours:
Tuesday 2 pm - 3 pm @ Bren Hall 3418
Best way to contact: e-mail/ slack

Course Description

This hands-on course explores widely used environmental data formats and Python libraries for analyzing diverse environmental data. Students will gain experience working with popular open data repositories and cloud platforms to source and analyze real-world environmental datasets. The course will also serve as an introduction to Python programming and provide opportunities to practice effective communication of the strengths and weaknesses of students' data products and analyses.

Learning Objectives

By the end of this course students will be able to:

- Write Python code from scratch following best practices and adapt code others write.
- Manipulate various types of environmental data, including tabular, vector, and raster data, using established Python libraries.
- Find and access datasets from major public environmental databases.
- Produce effective reports that combine text and code to share their data analyses with colleagues.

Code of conduct

We expect all course participants (including instructors, guests, and students) to be committed to actively creating, modeling, and maintaining an inclusive climate and supportive learning environment for all. We expect everyone to treat every member of our learning community with respect. Harassment of any kind will not be tolerated. Everyone is expected to read and adhere to the Bren School Code of Conduct and the UCSB Code of Conduct.

Access and accommodations

Please submit requests for accommodations often and early. If you have any kind of disability, whether apparent or non-apparent, learning, emotional, physical, or cognitive you may be eligible to use formal accessibility services on campus. ***To arrange class-related accommodations, please contact the Disabled Students Program (DSP).*** DSP will initiate communication about accommodations with faculty. By making a plan through DSP, appropriate accommodations can be implemented without disclosing your specific condition or diagnosis to course instructors.

Recommended Materials

There is no required textbook for this course. Some great public-access online books that can supplement the course materials are:

- An Introduction to Earth and Environmental Data Science
- Earth Observation Using Python: A Practical Programming Guide
- Use Data for Earth and Environmental Science in Open Source Python

- Python for Data Analysis

Course Policies

Attendance

In-person attendance to classes and discussion sections is crucial as it allows you to engage in hands-on activities while minimizing distractions, ask questions in real-time, and form connections with your peers and instructor. These experiences are designed to help you grow professionally! ***Regular attendance also mirrors professional expectations*** in many workplaces and is needed to grow relationships that can become valuable professional references.

Similar to missing a day at work, if you miss a class you are expected to:

- 📩 **Be proactive:** Notify the instructor before it happens or within a day and provide a brief explanation. Documentation is not required for missing a class, but honesty and professionalism is expected in all communication.
- 🔄 **Catch up:** Work with the instructors to review any missed material.
- 🤒 **Stay home when you are sick!** If you are feeling unwell, prioritize your health. Stay home and rest or work remotely.

Attendance does not count towards your grade, but it will be tracked and absences without communication will be addressed.

UCSB courses are taught in person, so absences for two or more weeks may require a Leave of Absence. If you have to miss multiple classes, contact the instructor, the Director of Student Affairs *and* the MEDS Program Coordinator to discuss possible next steps on how to support your wellbeing and progress within the program.

There will not be no option for remote attendance to class except for the class before Thanksgiving break. Other accommodations will need to be carefully considered for equity. Students with disabilities should work with the **Disabled Students Program (DSP)** to determine appropriate accommodations.

Course communication

Course communication will be mainly through Slack workspace and the website. For anything that we might need to keep track of (attendance notifications or draft submissions, for example) we'll use email.

Use of AI Tools

In this course, ***the use of generative AI tools (e.g., ChatGPT, GitHub Copilot) is discouraged.*** Our main goal is to help you build confidence and independence in Python programming by practicing, problem-solving, and collaborating with your peers and instructors. These experiences will set you up with the strongest foundation for success and allow you to use AI tools more responsibly, critically, and efficiently later on.

If you use generative AI in any course assignments or assessments, you are expected to adhere to the following course policies:

- ✅ **Cultivate understanding:** You should be able to fully understand, justify, and explain all the work you submit.
- 🤔 **Question AI outputs:** The default should be to assume the answers you get from generative AI are incorrect and you must verify any information the platform generates.
- 🚫 **Academic integrity:** Submitting work you don't understand or can't explain or justify will be considered plagiarism, regardless of whether you have disclosed the use of generative AI or not.
- 📄 **Document any AI use:** If you do end up using generative AI in your work, you will need to complete and submit a "Generative AI Use Documentation" form and include it with your assignment. The form will be provided with the assignment instructions.

If there are concerns about AI use in your work, your instructor will ask you to meet and talk it through. **If understanding is clearly lacking and this is the first time this happens, you'll have the chance to revise and resubmit your work for 50% of the original maximum grade within two days.** Repeated issues, however, will be referred to the UCSB Office of Student Conduct.

This policy relies on our shared commitment: your commitment to engaging deeply and authentically with the course material, and our commitment as instructors to supporting you every step of the way.

Grades

Grading Distribution

Grades will be based on three components:

- Homework: 75% (4 assignments, each 18.75%)
- Portfolio: 20%
- Participation: 5%

Grading Cutoffs

A+ (≥ 97%), A (≥ 92%), A- (≥ 90%),
B+ (≥ 87%) , B (≥ 82%), B- (≥ 80%),
C+ (≥ 77%), C (≥ 72%), C-(≥ 70%),
D+ (≥ 67%), D (≥ 62%), D-(≥ 60%), (60>) F.
There is no Pass/No Pass grading option for this course.

All assignments will be due on Gradescope and grades will be posted on UCSB's Canvas.

Homework

There will be 4 homework assignments. Assignments are assigned every other Friday starting on week 1 and should be submitted by 11:59 pm on next week's Saturday. Working together and collaborating with peers on homework is highly encouraged! However, submissions are individual so make sure you understand everything you are turning in.

All students can resubmit their assignments three days after they have received initial feedback. In this second submission, students may recover up to 50% of the points not obtained during the initial submission. Revisions, corrections, and improvements are crucial in the learning process! We greatly encourage you to resubmit your revised assignments.

Example:

> You submitted your homework on time on the due date and got a 6/10 in the assignment the coming Wednesday. You may build on the feedback received to correct your work and resubmit to improve your grade up to 8/10.

General homework calendar						
M	**T**	**W**	**R**	**F**	**Sat**	**Sun**
				Homework posted		
					Homework due	
		Grades posted		New homework posted	Resubmission due	
		Resubmission grades posted			Homework due	

Homework due and resubmission dates			
Hwk	**Date Posted**	**Due Date**	**Resubmission Date**
1	Friday 10/3	Saturday 10/11	Saturday 10/18
2	Friday 10/17	Saturday 10/25	Saturday 11/1
3	Friday 10/31	Saturday 11/8	Saturday 11/15
4	Friday 11/14	Saturday 11/22	Saturday 11/29

One-time, no-questions-asked, 4-day extension

- Every student may use **one 4-day extension** during the quarter, no questions asked.
- To request it, you will need to **send an e-mail to the co-instructor by the homework due date**. Only requests by the due date will be accepted.
- This extension may be used for any homework assignment and it does not apply to any of the portfolio deadlines.
- If you use the extension, you will still be able to submit your improved work by the resubmission due date (~1 day turnaround).
- Beyond this extension, **late work will only be accepted at the resubmission deadline** (worth up to 50% of the assignment points).

One-Time Extension & Resubmission Schedule
Yellow = days you can request your one-time extension

M	T	W	R	F	Sat	Sun
				Homework posted		
					Homework due	
		Grades posted Extended due date		New homework posted Extended grades posted	Resubmissions due	
		Resubmission grades posted			Homework due	

Portfolio

The final assignment for the course will be creating data science materials for the students' online professional portfolio. The portfolio materials consist of two items. The first one is a presentation-ready repository featuring geospatial analysis in Python. The second one is adding a blog post to their personal website based on previous assignments and discussion sections.

The 20% grade for the portfolio is divided as follows:

- 13% Data analysis + GitHub repository: a GitHub repository containing a finalized Jupyter Notebook and associated files for the data analysis,
- 7% blog post: a blog post in the student's professional portfolio based on previous assignments and discussion sections.

This portfolio piece will be public and is designed to showcase the high-quality work students are capable of producing in this course. Revisions to strengthen the work and incorporate feedback are a key part of that process. To support this, both an initial draft and a revised version that addresses feedback are needed. **Both submissions are required to receive a final grade for this component of the course; an assignment without a resubmission cannot earn credit.** The submission and revision calendar is below.

Portfolio work calendar				
Project component	**Available on**	**Due date**	**Feedback available on**	**Final submission**

Data analysis + GitHub repository	Monday 11/24	Saturday 12/6	Tuesday 12/9	Friday 12/12
Blog post	Monday 11/24	Wednesday, 12/3	Tuesday 12/9	Friday 12/12

Students will need to create a personal website using Quarto to submit the final project. All students enrolled in the course are invited to also attend relevant sessions of the MEDS Career & Professional Development Workshop Series, which will, in part, guide students through creating such websites. The necessary course materials and workshop prerequisites are available to follow online:

Creating personal websites using Quarto **(Live session on 10/1)**
Customizing Quarto Websites using CSS & Sass **(Live session on 10/15)**
Adding a blog to your existing Quarto website **(Live session on 11/12)**

Participation

To obtain full participation credit, students must:

1. Answer two short surveys about their course experiences, one at the beginning and one at the end of the course.
2. Share their coding solutions for exercises or homework during lecture or discussion sections at the front of the class once during the course. A presentation date during the discussion section has been randomly assigned to each student: click to see presentation calendar. Students can trade dates among themselves if they're unable to attend the assigned date. Please notify the TA about any presentation updates. Time for presentation during class time may also be available (although unscheduled) and will count for the presentation grade.

Class calendar

The following is a simplified calendar for the course to indicate due dates and weekly topics. *The lecture plan and calendar may be subject to change as the course progresses.*

Week (Monday start date)	Topic	Monday	Tuesday - Lecture	Wednesday	Thursday - Lecture	Friday - Discussion Section	Saturday
Week 0 **Sept 22**	-				**Sept 25** Course starts Entry survey due	**Sept 26**	-
Week 1 **Sept 29**	Python Review / Tabular Data I					**Oct 3** Hwk 1 available	-
Week 2 **Oct 6**	Tabular Data II					-	**Oct 11** Hwk 1 due
Week 3 **Oct 13**	Tabular Data III					**Oct 17** Hwk 2 available	**Oct 18** Hwk 1 resubmission
Week 4 **Oct 20**	Vector Data I					-	**Oct 25** Assignment 2 due
Week 5 **Oct 27**	Vector Data II					**Oct 31** Hwk 3 available	**Nov 1** Hwk 2 resubmission
Week 6 **Nov 3**	Multi-dimensional data					-	**Nov 8** Assignment 3 due
Week 7 **Nov 10**	Rasters I		**Nov 11** No class / Veteran's day			**Nov 14** Hwk 4 available	**Nov 15** Hwk 3 resubmission
Week 8 **Nov 17**	Rasters II					-	**Nov 22** Assignment 4 due
Week 9 **Nov 24**	Rasters II	**Nov 24** Portfolio instructions available			**Nov 27** No class or section / Thanksgiving Break	**Nov 28**	**Nov 29** Hwk 4 resubmission
Week 10 **Dec 1**	Extra topics			**Dec 3** Blog post due			**Dec 6** Data analysis + GH repo due
Finals **Dec 8**	-					**Dec 12** Portoflio final submission	**Dec 13** Exit survey due

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Student Resources

There are many on-campus resources for helping students navigate different challenges and grow community. ***I (Carmen, your instructor) am always available to discuss your individual needs and help guide you towards a campus resource that may be best suited to your situation.*** A number of those resources are listed, below:

🍎 Basic Needs Resources & Food Insecurity

UCSB has a dedicated team for helping students navigate and find help meeting basic needs. Explore the Basic Needs Resources web page for more information on their many resources, including information on the CalFresh Program and The Associated Students food bank.

😌 Counseling and Psychological Services (CAPS)

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. CAPS is available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus. They can be reached by phone at 805.893.4411, or online at http://caps.sa.ucsb.edu.

The CAPS building is the pink building next to the Humanities and Social Science building (HSSB)

🌈 Resource Center for Sexual and Gender Diversity (RCSGD)
Located in the Student Resource Building (SRB), RCSGD offers a host of services for LGBTQ+ students, including a library and many events throughout the year. Learn more at: https: //rcsgd.sa.ucsb.edu/

🦋 Undocumented Student Services (USS) Program
The USS Program and associated Dream Scholars Resource Team (DSRT) offer workshops, help students find scholarships and financial support, and work to provide a community for undocumented students. Learn more at: https://uss.sa.ucsb.edu/

📚 Campus Learning Assistance Services (CLAS)
CLAS helps students grow academically by offering workshops, walk-in and pre-scheduled tutoring, and writing help both for native and non-native (ESL) English as a second language speakers. Over 50% of students will stop by CLAS at one time or another. http: //clas.sa.ucsb.edu

🌍 Student Resource Building (SRB)
The SRB houses many campus resources offices, including the African Diasporic Cultural resource Center, the American Indian Resource Center, the Asian Resource Center, the Middle Eastern Resource Center, the Non-Traditional and Re-Entry Student Resource Center.
http: //www.sa.ucsb.edu/student-resource-building/home

🎭 Multicultural Center (MCC)
The MCC, located in UCEN, hosts a wide variety of cultural events and educational programming throughout the year, including film showings, lectures, musical performances, and more: http://mcc.sa.ucsb.edu/

💙 Campus Advocacy, Resources, & Education (CARE)
CARE offers 24/7 confidential support and advocacy in situations of sexual assault, dating and domestic violence, and stalking. Located in the SRB, they can be reached at 805.893.4613 or http: //wgse.sa.ucsb.edu/care/home

🏠 Financial Crisis Response Team
If you are experiencing issues of housing insecurity contact the Financial Crisis Response Team at financialcrisis@sa.ucsb.edu to begin application for assistance.

🌱 Health and Wellness

Student well-being is integral to academic success, student development, and life satisfaction. On this website, students will find links to a range of services related to well-being such as: assistance with basic needs (food, housing, finances); counseling and physical health resources, daily wellness centers and programs; social connection, and personal safety. https: //wellbeing.ucsb.edu/