

SIO 40: “Life and Climate on Earth” (Fall 2024)

Description: This course is an introduction to how the living things on our planet affect, and are affected by, the global environment. We will discuss how life evolved on earth, and how the planet changed with the advent of life. We will explore how the non-living components of the earth system (atmosphere, solid earth, water) interact with the living components to create the comfortable planet that we know and love. In the second part of the course, we will discuss issues related to Earth’s climate history, modern-day global climate change, the impacts that mankind has had and potentially will have on our environment, and climate mitigation efforts. *A major goal of this course is to provide non-earth/environmental science majors with the basic scientific background and facts needed to understand and appreciate current news topics and political issues related to earth and climate science.*

Upon completion of this course, students will be able to:

1. Describe the origins of Earth as a planet.
2. Identify the impact of life processes on the Earth system.
3. Recognize the different components of the modern Earth system, and how they interact.
4. Interpret current climate trends in light of Earth’s climate history.
5. Explain the causes and impacts of anthropogenic global warming.
6. Critique commonly discussed climate change mitigation strategies.

Course Credit: 4.00 credit hours, 10 hours per week on assignments/readings

Course website: All material for this course, including the course syllabus, lecture files, homework assignments and answer keys, exams, etc. will be available on the SIO 40 course website on Canvas. If you have not used Canvas before, refer to the left-side menu’s help section (the question mark icon).

Reading: There are no required textbooks for this course. Necessary information for homeworks, exams etc. is covered in the lecture slides posted on Canvas, unless you are specifically instructed otherwise. Supplementary reading materials and links to websites relevant to various lecture topics will also be posted on the class website.

Course format: This course will be presented as an in-person lecture course, with some options for asynchronous learning. Lectures will be presented MWF in MOS 0113. *You are strongly encouraged to attend lecture in person for the best learning experience.* However, students who are experiencing COVID-19 symptoms or who are under COVID-19 quarantine restrictions should not attend class. Students who are experiencing difficulty attending class in person due to their current housing situation should contact the instructor. Podcasts of each lecture, including audio and screencasting, will be posted on Canvas in the Media Gallery section after each lecture is given. Slides with notes for each lecture will also be posted on Canvas. There will also be opportunities for online interaction

with the instructor and TAs via Zoom and Canvas chat. Please understand that in-person lectures may need to be altered, temporarily suspended, or eliminated depending on COVID-19-related developments on campus and/or with the instructor. You are required to observe UCSD COVID-19 protocols if attending class in-person, see:

<https://returntolearn.ucsd.edu/return-to-campus/academics/index.html>

Lecture schedule and homework assignments:

<u>Date</u>	<u>Lec #</u>	<u>Lecture Topic</u>	<u>HW due</u>
Sep. 27 F	1	Introduction/overview	
Sep. 30 M	2	Origins: Earth and the elements	
Oct. 2 W	3	Origins: Biological evolution	
Oct. 4 F	4	Life's Beginnings: How the planet changed with life I	
Oct. 7 M	5	Life's Beginnings: How the planet changed with life II	HW1
Oct. 9 W	6	Energy balance and greenhouse effect	
Oct. 11 F	7	Maintaining a habitable planet	
Oct. 14 M	8	Climate – what could go wrong?	
Oct. 16 W		MIDTERM 1 review	HW2
Oct. 18 F		MIDTERM 1	
Oct. 21 M	9	Atmosphere/hydrologic cycle	
Oct. 23 W	10	Oceans	
Oct. 25 F	11	Cryosphere	
Oct. 28 M	12	Lithosphere	
Oct. 30 W	13	Carbon cycle	HW3
Nov. 1 F	14	Earth's most ancient climate history	
Nov. 4 M	15	Pleistocene Glaciations	
Nov. 6 W	16	Earth's recent climate history	
Nov. 8 F		MIDTERM 2 review	HW4
Nov. 11 M		<i>Veteran's Day holiday</i>	
Nov. 13 W		MIDTERM 2	
Nov. 15 F	17	The Anthropocene – human imprint on climate	
Nov. 18 M	18	Climate change projections/impacts	
Nov. 20 W	19	Ocean acidification and warming, sea level rise	
Nov. 22 F	20	Climate change amplified: Polar regions	
Nov. 25 M	21	Climate change denialism	HW5
Nov. 27 W	22	Geoengineering part I – Solar Radiation Management	
Nov. 29 F		<i>Thanksgiving holiday</i>	
Dec. 2 M	23	Geoengineering part II – Carbon Dioxide Removal	
Dec. 4 W	24	Policy solutions, international negotiations	
Dec. 6 F		FINAL review	HW6
Dec. 10 Tu		FINAL EXAM	

Locations and times for in-person lectures: MOS 0113

MWF 11:00 -11:50 am

TA-led online chat sessions and extra review sessions: TBA, watch for announcements on Canvas home page

Instructor office hours: online via Zoom (TBA) and by appointment. Instructor will also be available to speak with in person before or after class.

Suggested weekly schedule: In order to keep up with the material, students are strongly urged to “digest” three lectures per week. This can be done by a combination of attending class in-person and accessing on-line resources. Lecture podcasts will be available online to supplement in-person lecture attendance. Annotated lecture slides and written lecture summaries will also be provided online for each lecture to supplement student note-taking. Students will also need to make time each week to work on homework assignments (due after every 4 lectures, see dates on lecture schedule, previous page). Optimal exam preparation will require review in advance, and preparation of exam notes.

Grades based on: 6 homework assignments (25%); Mid-Term Exam #1 (20%); Mid-Term Exam #2 (20%); and Final Exam (35%). All exams will be taken in class during the scheduled class period or final exam period. There will be opportunities to obtain extra credit, including a project due during finals week, course evaluation bonus, and participation points for in-class “bonus questions”.

Exam format: Exams will be in-class, multiple-choice format, with handwritten notes allowed (one sheet for midterms, three sheets for final).

Letter grades for the class based on the overall weighted scores will be assigned as follows:

≥ 95% = A+; 90-94% = A; 85-89% = A-; 80-84% = B+; 75-79% = B; 70-74% = B-

65-69% = C+; 60-64% = C; 55-59% = C-

Exam grades may be curved if necessary.

Submitting homework: Homework will be completed on Canvas. Late homework (beyond noon of the following day Pacific Time) will not be accepted. In case of emergency, extensions may be requested by emailing the instructor no later than 5 pm on the due date, and providing a documented excuse.

Exam accommodations: Students who require alternative timing or accommodations for taking the midterms or final should register with the Triton Testing Center ASAP. Students who miss an exam due to emergency (sickness, accident, family issue) should contact the instructor ASAP with documented evidence of the emergency to arrange a make-up. Students who fail to provide documentation of an emergency as a reason for missing the exam will be offered an essay version of the exam as a make-up.

Academic Integrity: Students found to be cheating on exams (e.g. copying from other students, bringing extra notes or notes in typed format, taking copies of the exam for other students) will receive zero credit for the exams.

Teaching team: Instructor - Kathy Barbeau, kbarbeau@ucsd.edu



I am a marine chemist, my lab is located on the Scripps Institution of Oceanography campus. You can find out more about my research at <https://kbarbeau.scrippsprofiles.ucsd.edu/she/her/hers>

Teaching Assistants –



Max Fenton,
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SIO graduate student, marine trace metal chemistry
he/him/his



Minerva Padilla Villa,
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SIO graduate student, marine trace metal chemistry
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Julia Hagedorn
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SIO graduate student, coral reef microbiology
she/her/hers

Student Resources for Support and Learning

Library Help

For questions about eReserves and research tools:

<https://library.ucsd.edu>

Learning Support Resources

[Writing Hub](#)

<https://aah.ucsd.edu/learning-strategies/index.html>

[Mental Health Services](#)

Community Centers

Learn about the different ways UC San Diego explores, supports and celebrates the many cultures that make up our diverse community.

<https://students.ucsd.edu/student-life/diversity/index.html>

Accessibility

Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD) which is located in University Center 202 behind Center Hall. Students are required to present their AFA letters to Faculty (please make arrangements to contact me privately) and to the OSD Liaison in the department in advance so that accommodations may be arranged.

Contact the OSD for further information: <https://disabilities.ucsd.edu/>.
osd@ucsd.edu | 858. 534.4382

Inclusion

We are committed to creating a learning environment that supports diversity of thought, perspective, experience, and identities. We encourage students to participate in discussion and contribute to the field from their perspective.

Office of Equity, Diversity, and Inclusion:

858.822.3542 | diversity@ucsd.edu | <https://diversity.ucsd.edu/>

<https://students.ucsd.edu/student-life/diversity/index.html>

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Basic Needs

Any student who has difficulty accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in this course, is encouraged to contact:

foodpantry@ucsd.edu | basicneeds@ucsd.edu | (858)246-2632

Technical Support

For help with accounts, network, and technical issues:

<https://acms.ucsd.edu/contact/index.html>

UC San Diego Academic Policies

Academic Integrity

Academic Integrity is expected of everyone at UC San Diego. This means that you must be honest, fair, responsible, respectful, and trustworthy in all of your actions. Lying, cheating, or any other forms of dishonesty will not be tolerated because they undermine learning and the University's ability to certify students' knowledge and abilities. Thus, any attempt to get, or help another get, a grade by cheating, lying or dishonesty will be reported to the Academic Integrity Office and will result in sanctions. Sanctions can include an F in the class and suspension or dismissal from the University. So, think carefully before you act. Before you act, ask yourself the following questions: a) is my action honest, fair, respectful, responsible, and trustworthy, and b) is my action authorized by the instructor? If you are unsure, don't ask a friend, ask your instructor, instructional assistant, or the Academic Integrity Office. You can learn more about academic integrity at academicintegrity.ucsd.edu. (Source: Bertram Gallant, T. (2017). Teaching for integrity. UC San Diego Academic Integrity Office.)

Classroom Behavior Policy

In order to foster a positive learning environment, please limit use of cell phones, mobile devices, etc. to break times.

Also refer to:

[Principles of Community](https://ucsd.edu/about/principles.html)

(<https://ucsd.edu/about/principles.html>)

Religious Accommodation

It is the policy of the university to make reasonable efforts to accommodate students having bona fide religious conflicts with scheduled examinations by providing alternative times or methods to take such examinations. If a student anticipates that a scheduled examination will occur at a time at which his or her religious beliefs prohibit participation in the examination, the student must submit to the instructor a statement describing the nature of the religious conflict and specifying the days and times of conflict.

For final examinations, the statement must be submitted no later than the end of the second week of instruction of the quarter.

For all other examinations, the statement must be submitted to the instructor as soon as possible after a particular examination date is scheduled.

If a conflict with the student's religious beliefs does exist, the instructor will attempt to provide an alternative, equitable examination that does not create undue hardship for the instructor or for the other students in the class.

Discrimination and harassment

The University of California, in accordance with applicable federal and state laws and university policies, does not discriminate on the basis of race, color, national origin, religion, sex, gender, gender identity, gender expression, pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition, genetic information, ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services (including membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services). The university also prohibits harassment based on these protected categories, including sexual harassment, as well as sexual assault, domestic violence, dating violence, and stalking. The nondiscrimination policy covers admission, access, and treatment in university programs and activities.

If students have questions about student-related nondiscrimination policies or concerns about possible discrimination or harassment, they should contact the Office for the Prevention of Harassment & Discrimination (OPHD) at (858) 534-8298, ophd@ucsd.edu, or reportbias.ucsd.edu.

Campus policies provide for a prompt and effective response to student complaints. This response may include alternative resolution procedures or formal investigation. Students will be informed about complaint resolution options.

A student who chooses not to report may still contact CARE at the Sexual Assault Resource Center for more information, emotional support, individual and group counseling, and/or assistance with obtaining a medical exam. For off-campus support services, a student may contact the Center for Community Solutions. Other confidential resources on campus include Counseling and Psychological Services, Office of the Ombuds, and Student Health Services.

CARE at the Sexual Assault Resource Center

858.534.5793 | sarc@ucsd.edu | <https://care.ucsd.edu>

Counseling and Psychological Services (CAPS)

858.534.3755 | <https://caps.ucsd.edu>

Subject to Change Policy

The information contained in this course syllabus, other than the grade and absence policies, may be – under certain circumstances such as mutual agreement to enhance student learning – subject to change with reasonable advance notice, as deemed appropriate by the instructor.