

Course Syllabus

[Jump to Today](#) Edit

Course Description: An introduction to chemical compounds and their biogeochemical cycles in the oceans and atmosphere, with emphasis on climate issues like ocean acidification, greenhouse gases and the carbon cycle, other biogeochemical cycles, chlorofluorocarbons and the ozone hole, urban pollutants and their photochemistry, and aerosol particles and their effects on clouds.

Prerequisites: CHEM 6C or CHEM 6CH and MATH 20C or MATH 31BH or consent of instructor.

Textbook: Atmospheric topics in this course (Instructor: Russell) use Jacob 2000 **Introduction to Atmospheric Chemistry**, available for purchase on Amazon and for free online at <http://acmg.seas.harvard.edu/publications/jacobbook/index.html> (Links to an external site.).

Lecture Schedule (this may be updated during the quarter):

Date		Dy	Ins.	Ch	Lectures and Topics
30-Mar	1a	Tu	JS		Course overview: Why study ocean and atmosphere together?
1-Apr	1b	Th	JS		How does the sea become salty? Weathering reactions
6-Apr	2a	Tu	JS		Carbon chemistry in seawater
8-Apr	2b	Th	JS		Acid-base ocean chemistry
13-Apr	3a	Tu	JS		Anthropogenic CO ₂ uptake by the ocean
15-Apr	3b	Th	JS		Ocean acidification
20-Apr	4a	Tu	JS		Alkalinity and calcium carbonate precipitation/dissolution
22-Apr	4b	Th	JS		Long-term control of atmospheric CO ₂ and feedbacks
27-Apr	5a	Tu	JS		Methane, N ₂ O, ozone, and other greenhouse gases
29-Apr	5b	Th	JS		Snowball Earth, long-term atmospheric oxygen variation
4-May	6a	Tu	JS		MIDTERM EXAM - Oceans
6-May	6b	Th	LR	7	Greenhouse Gases and their Effects
11-May	7a	Tu	LR	10	Stratospheric Ozone Formation
13-May	7b	Th	LR	10	The Ozone "Hole"
18-May	8a	Tu	LR	11	Tropospheric Oxidation by OH
20-May	8b	Th	LR	11	Tropospheric O ₃ Production
25-May	9a	Tu	LR	12	Ozone Limiting Factors
27-May	9b	Th	LR	12	Ozone and Pollution Control
1-Jun	10a	Tu	LR	8	Aerosols and their Lifetimes
3-Jun	10b	Th	LR	8	Climate Engineering by Aerosols
8-Jun			LR		FINAL EXAM - Atmosphere (8-11am, Location Online)

Assignments and Exams: These are listed in the course summary, but this list is not complete and will be updated. Check back here and on the online syllabus to find new updates. The midterm will be given as listed in the Schedule above.

Scanning App: If you want to write your homework and exams on paper rather than using a text editor, you will need a way to scan and post that information. There are many free scanning apps for cell phones, e.g. GeniusScan <https://thegrizzlylabs.com/genius-scan> (Links to an external site.). It is easy to use, allows students to make multi-page pdfs, and can automatically apply color and perspective corrections. The scan results can be saved and uploaded directly to Canvas.

Messaging the Instructors: To enable the Instructors to prioritize responding to your messages, please send messages from the Canvas messaging system whenever possible.

Grading Scale:

- 90 – 100% A
- 80 – 89% B
- 70 – 79% C
- 60 – 69% D
- 0 – 59% F

Grade Dissemination: Graded tests and materials in this course will be returned individually. You can access your scores at any time on TritonEd.

Late Work Policy: There are no make-ups for quizzes or exams. We do not accept late work. TritonEd is configured to accept completed assignments up to the midnight of the due date and then it will not accept submissions. We will share complete information on assignments to allow ample time for completion if you do not procrastinate. Please respect the time of your instructors and your colleagues; plan ahead and submit on time so that we can all progress through this learning experience together.

Grades of "Incomplete": The current university policy concerning incomplete grades will be followed in this course. Incomplete grades are given only in situations where unexpected emergencies prevent a student from completing the course and the remaining work can be completed the next semester. Your instructor is the final authority on whether you qualify for an incomplete. Incomplete work must be finished by the end of the subsequent quarter or the "I" will automatically be recorded as an "F" on your transcript.

Disability Access: 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: 858.534.4382

(phone); osd@ucsd.edu(email); <http://disabilities.ucsd.edu>[Links to an external site.](#) (website).

Title IX Compliance: The University recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, we are interested in promoting a safe and healthy environment, and should we learn of any sexual misconduct, physical and/or psychological abuse, we must report the matter to the Title IX Coordinator. Should you want to speak to a confidential source you may contact the Counseling Center. The Office for the Prevention of Harassment & Discrimination (OPHD) provides assistance to students, faculty, and staff regarding reports of bias, harassment, and discrimination. OPHD is the UC San Diego Title IX office. Title IX of the Education Amendments of 1972 is the federal law that prohibits sex discrimination in educational institutions that are recipients of federal funds. Students have the right to an educational environment that is free from harassment and discrimination. Students have options for reporting incidents of sexual violence and sexual harassment. Sexual violence includes sexual assault, dating violence, domestic violence, and stalking. Information about reporting options may be obtained at OPHD at (858) 534-8298, ophd@ucsd.edu or <http://ophd.ucsd.edu>[Links to an external site.](#). Students may receive confidential assistance at CARE at the Sexual Assault Resource Center at (858) 534-5793, sarc@ucsd.edu or <http://care.ucsd.edu>[Links to an external site.](#) or Counseling and Psychological Services (CAPS) at (858) 534-3755 or <http://caps.ucsd.edu>[Links to an external site.](#). Students may feel more comfortable discussing their particular concern with a trusted employee. This may be a student affairs staff member, a department Chair, a faculty member or other University official. These individuals have an obligation to report incidents of sexual violence and sexual harassment to OPHD. This does not necessarily mean that a formal complaint will be filed. If you find yourself in an uncomfortable situation, ask for help.

Online "Attendance" Policy: All students are responsible for all information and updates provided in all scheduled lectures, which will also be posted online whenever possible. Our expectations for your virtual and mental attendance of class is that you be prepared, engaged, and “present” for all discussions or activities. Illness, wifi problems, and unforeseen circumstances may prevent you from attending one or more classes during the quarter. Automated recordings have been scheduled, but they do not always work perfectly. If you have questions, please ask them in office hours (by zoom) or write to us using the Canvas messaging system.

Professionalism Policy: We expect the classroom to be an active, open environment, which encourages diverse thought and comments. Please attend to all university policy and classroom etiquette procedures. Those not heeding the policies will be asked to

leave the classroom/lab immediately so as to not disrupt the learning environment. Please arrive on time, be attentive, and respectful for all class meetings. Students who habitually disturb the class by talking, arriving late or other unprofessional behavior may suffer a reduction in their final class grade. Active, positive, engaging, participation in class activities is essential. As pre-professionals or professionals, you should be at the point in your career where you have learned to ask and answer these questions:

1. How do I know when I know something? What is the evidence and how reliable is it?
2. How are things, events, theories, models or people connected? What is the cause and effect?
3. What is new and what is old - have I run across this idea before? When, where, what did it mean to me then, and how I can expand and further connect the concept now?
4. So what? Why does it matter? What does it all mean?

Academic Conduct Policy: The Policy on Integrity of Scholarship aims to encourage and maintain the highest ethical standards in research. The policy reaffirms the University's commitment to integrity: Integrity is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind. Instructors, for their part, will exercise care in planning and supervising academic work, so that honest effort will be upheld. It is against policy to submit the same paper for credit in more than one course.

Instructor Goals. At a minimum, we hope to pursue the following goals and solicit your open and timely feedback on how well we are meeting these goals:

- Communicate effectively and frequently;
- Be enthusiastic, active and involved in learning;
- Demonstrate a mastery of the discipline;
- Relate material to current practice and research;
- Clearly explain complex concepts and ideas;
- Provide a framework for lifelong learning;
- Strive to involve participants in class activities;
- Be available to assist participants in or out of class; and
- Have respect and concern for all participants.

Course Summary:

Date	Details	Due
Tue Mar 30, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
Thu Apr 1, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
Fri Apr 2, 2021	Calendar Event SIO 174 - office hours for Jeff	2pm to 3pm
Tue Apr 6, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
Thu Apr 8, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
	Assignment Oceans Problem Set #1	due by 9:30am
Fri Apr 9, 2021	Calendar Event SIO 174 - office hours for Jeff	2pm to 3pm
Tue Apr 13, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
Thu Apr 15, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
	Assignment D07b-WhatStopsTheO3Hole?	due by 11:59pm
Fri Apr 16, 2021	Calendar Event SIO 174 - office hours for Jeff	2pm to 3pm
Tue Apr 20, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
Thu Apr 22, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
	Assignment Oceans Problem Set #2	due by 9:30am
Fri Apr 23, 2021	Calendar Event SIO 174 - office hours for Jeff	2pm to 3pm
Tue Apr 27, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am

Date	Details	Due
Thu Apr 29, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
Fri Apr 30, 2021	Calendar Event SIO 174 - office hours for Jeff	2pm to 3pm
Tue May 4, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
	Assignment MIDTERMEXAM-Oceans	due by 11am
Thu May 6, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
	Assignment Q06b-RadiationBalanceQuiz	due by 9:30am
	Assignment D06b-Faint Sun	due by 11:59pm
Fri May 7, 2021	Assignment Integrity&PolicyQuiz	due by 11am
	Assignment PracticeQuiz	due by 11am
	Assignment DiscussionSignUps	due by 5pm
Sun May 9, 2021	Assignment H06 Assignment	due by 5pm
Tue May 11, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
	Assignment Q07a-ReactionRatesReviewQuiz	due by 9:30am
	Assignment D07a-WhyDoesO3FormALayer?	due by 11:59pm
Thu May 13, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
	Assignment Q07b-SteadyStateReviewQuiz	due by 9:30am
Sun May 16, 2021	Assignment H07 Assignment	due by 5pm

Date	Details	Due
	Calendar Event SIO174LectureOnline	9:30am to 11am
Tue May 18, 2021	Assignment Q08a-TroposphericSources&SinksQuiz	due by 9:30am
	Assignment D08a-WhatDeterminesCH4Lifetime?	due by 11:59pm
Thu May 20, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
	Assignment D08b-WhatMakesTroposphericO3?	due by 11:59pm
Sun May 23, 2021	Assignment H08 Assignment	due by 5pm
	Calendar Event SIO174LectureOnline	9:30am to 11am
Tue May 25, 2021	Assignment Q09a-HydrocarbonQuiz	due by 9:30am
	Assignment D09a-WhatLimitsO3Production?	due by 11:59pm
Thu May 27, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am
	Assignment Q09b-UrbanO3Quiz	due by 9:30am
	Assignment D09b-WhatChangesO3Production?	due by 11:59pm
Sun May 30, 2021	Assignment H09 Assignment	due by 5pm
	Calendar Event SIO174LectureOnline	9:30am to 11am
Tue Jun 1, 2021	Assignment Q10a-Aerosols&SizeQuiz	due by 9:30am
	Assignment D10a-HowLongAreAerosolLifetimes?	due by 11:59pm
Thu Jun 3, 2021	Calendar Event SIO174LectureOnline	9:30am to 11am

Date	Details	Due
	Assignment Q10b-AerosolCoolingQuiz	due by 9:30am
	Assignment D10b-WhichAerosolsCoolTheEarth?	due by 11:59pm
Fri Jun 4, 2021	Assignment REVIEW-Quiz	due by 11:30am
Sun Jun 6, 2021	Assignment H10 Assignment	due by 5pm
Tue Jun 8, 2021	Calendar Event SIO 174 - Final Exam	8am to 11am