

GLY 3074
The Oceans and Global Climate Change
Spring 2025

Instructor: Dr. Cassandre Stirpe (email: cassandre.stirpe@ufl.edu)
377 Williamson Hall; Office Hours: by appointment

TA: Annemarie Mueller (amueller1@ufl.edu)

Lectures: M,W,F, Period 9, 4:05 – 4:55 pm, Florida Gymnasium (FLG) 265

Objectives: The oceans store and redistribute heat, moisture and carbon dioxide. As such, they profoundly influence climate and modulate natural and anthropogenic climate change. The goal of this course is for you to understand the role the oceans play in determining climate and regulating global climate change. We will start with an introduction to the climate system, then cover atmospheric and ocean circulation, the relationship between the oceans and the global carbon system, and finally discuss the current record of short-term global change and the long-term record of global climate preserved in the oceans.

By the end of the course you should understand:

- the basics of how the atmosphere and ocean circulate
- the processes that drive climate change
- the reservoirs and fluxes of carbon on earth
- how to evaluate the evidence for modern climate change and predictions of future climate change
- what the long-term history of global climate change can teach us about modern climate and climate change
- potential ways to combat climate change

Textbook (highly recommended):

Kump, Kasting and Crane, 3rd edition, 2010, The Earth System, Pearson.

There is no perfect textbook for this course. The Kump, Kasting and Crane book covers a lot of the important material, but we will jump around some rather than reading it straight through. There are several chapters that will not be assigned and I will post additional reading material on Canvas.

Grading:	Individual in-class activities	5%
	TBL Exercises and Peer evaluations	20%
	Homework Assignments	20%
	3 Exams (15% each)	45%
	Other projects/assignments	10%

Assignments handed in late without prior permission will only receive 50% of their original value.

Final grading scheme:

Percentage earned	93%-100%	90%-92%	87%-89%	83%-86%	80%-82%	77%-79%	73%-76%	70%-72%	etc. <60%
Letter Grade	A	A-	B+	B	B-	C+	C	C-	F

Individual in-class activities:

These are short sessions of writing or drawing during class time, usually used to break up lectures. They're mostly a way of seeing if you've been attending class, paying attention, and following instructions.

Team Based Learning (TBL) and Peer Evaluations:

This course will be taught in part using Team Based Learning Techniques (TBL). This means that I will divide the class into teams of ~4 students and we will frequently break from lectures to work on problems or projects that you will complete as a team. Most of the TBL activities will occur during class time, thus attendance is critical to your participation in your team. During the semester you will be asked to submit assessments of your peers' contributions, and your teammates' evaluations will be factored into your grade. This helps keep group members accountable.

Homework assignments:

There will be several short take home assignments throughout the semester. These are designed to let you think about some of the concepts independently or to give you hands-on experience manipulating data.

Exams: There are 3 exams that will be administered during regular class times (*each is worth 15% of your grade*). Each exam will cover the material from the previous third of the course, but may build on material from previous sections. Exams will consist of a mixture of fill-in-the-blank/multiple choice, short answer, and essay questions.

Other projects/assignments:

There will be other activities (such as lab worksheets) throughout the semester. I will do my best to be clear about how each assignment is being graded. This is also a "flex space" that I can use to adjust weighting if necessary (see note below).

Note: Because this is my first time teaching this course and I am making some changes from the previous syllabus, there is a chance some of the weighting will be adjusted. The relative contributions are unlikely to change (*i.e.* exams will remain more important than in-class activities), but as later parts of the class evolve, I may decide the initial grading scheme is unfair or imbalanced. I want grades to reflect both effort and learning, and if I make adjustments in the future, it is because I think one of the non-exam parts of the class should be more important than it is. *If I make any changes, I will let you know.*

Preliminary Syllabus/Schedule		
Week 1: Intro to Earth's Climate System	M – Jan 13	Course Intro, What is Climate
	W – Jan 15	What is Climate, Earth's Climate System
	F – Jan 17	Earth's Climate System
Week 2: Energy Balance	M – Jan 20	—
	W – Jan 22	Earth's Energy Balance
	F – Jan 24	The Greenhouse Effect
Week 3: Forcings and Feedbacks, Intro to the Atmosphere	M – Jan 27	Climate Forcings and Feedbacks
	W – Jan 29	Atmospheric Circulation I
	F – Jan 31	Atmospheric Circulation II
Week 4: Connecting Circulation to Regional Climate	M – Feb 03	Circulation and Precipitation
	W – Feb 05	TBA
	F – Feb 07	Unit 1 Exam
Week 5: Surface Ocean Circulation I	M – Feb 10	Wind-driven Circulation
	W – Feb 12	Geostrophic Flow
	F – Feb 14	Major Global Currents
Week 6: Surface Ocean Circulation II	M – Feb 17	Surface Ocean Heat Transport
	W – Feb 19	TBA
	F – Feb 21	TBA
Week 7: Deep Ocean Circulation I	M – Feb 24	Thermohaline Circulation
	W – Feb 26	Bottom Water Formation
	F – Feb 28	TBA
Week 8: Deep Ocean Circulation II	M – Mar 03	Major Water Masses
	W – Mar 05	Water Mass Aging
	F – Mar 07	TBA
Week 9: Oceans and Climate	M – Mar 10	TBA
	W – Mar 12	TBA
	F – Mar 14	Unit 2 Exam
Week 10: SPRING BREAK	M – Mar 17	no class
	W – Mar 19	no class
	F – Mar 21	no class
Week 11: The Carbon Cycle	M – Mar 24	Short-term
	W – Mar 26	Long-term
	F – Mar 28	Ocean Carbon Cycling
Week 12: Global Climate Change	M – Mar 31	Causes on Multiple Timescales
	W – Apr 02	TBA
	F – Apr 04	TBA

Week 13: Paleoclimate	M – Apr 07	Proxies and Records
	W – Apr 09	Pleistocene Paleoclimate
	F – Apr 11	Cenozoic Paleoclimate
Week 14: Anthropogenic Climate Change	M – Apr 14	Records and Evidence
	W – Apr 16	Modeling and Predictions
	F – Apr 18	Climate Mitigation Efforts
Week 15: Wrap-up	M – Apr 21	TBA
	W – Apr 23	TBA
	F – Apr 25	Reading day

Course Logistics:

e-learning site: There is a Canvas site for the course that you should already have access to. Contact me if you have any trouble. The site includes abbreviated versions of the PowerPoint presentations from lectures, announcements about assignments and activities, study guides for exams, and grade information (warning- the final grade calculated by Canvas does not accurately reflect your grade, which is composed of many parts).

Class Conduct: Please be considerate of your fellow students and me during the class period. Please try to get to class on time, stay until the end and pay attention to the class rather than your phone or computer. These are basic, common courtesies that prevent distractions during class.

Academic Integrity: All students registered at the University of Florida have agreed to comply with the following statement: “I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.”

In addition, on all work submitted for credit the following pledge is either required or implied: *“On my honor I have neither given nor received unauthorized aid in doing this assignment.”*

If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). For additional information on Academic Honesty, please refer to the University of Florida Student Honor Code (UF Reg. 4.040). <https://regulations.ufl.edu/wp-content/uploads/2018/06/4.040-1.pdf>

Because you will be turning in assignments and giving presentations on material that is readily available on the web, I want to stress that taking sentences verbatim from the web is **plagiarism** as is taking sentences or paragraphs from any source, even if you cite the source. It is also plagiarism if you intersperse extracted sentences from different websites. These forms of plagiarism are relatively easy to detect. My policy is that you will receive an F in the course if I detect plagiarism on any assignment or if I detect any other type of cheating. The web can be a great resource, but remember that you must properly credit websites that you use for information. Also remember that anyone can post anything on the web. Make sure you use sites that have some validity.

Mental Health and Well-being

Life offers numerous challenges and being a student can be one of them. If you are mentally or emotionally struggling for any reason, you can contact the [Counseling and Wellness Center](https://counseling.ufl.edu/) (<https://counseling.ufl.edu/>). They have one-click access to people who can help you connect to the right resources for your situation. If these struggles are negatively impacting your performance in your courses, I encourage you to contact the [Dean of Students Care Area](https://care.dso.ufl.edu/) (<https://care.dso.ufl.edu/>) to connect with a support team that can help with temporary accommodations, authorization to make up missing course work, etc. Additionally, if you are comfortable doing so, please reach out to me and I will provide any accommodations in this course that I can.

Accommodation for Students with Disabilities

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the [Disability Resource Center](https://disability.ufl.edu/get-started/) (<https://disability.ufl.edu/get-started/>). It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Athletes and Other Students with Extensive Extracurricular Activities- I make an effort to work with *all students'* schedules, but communication is critical to make the process work. You need to talk to me in person if you will be missing classes and turning in late assignments. I consider a note from the Athletic Association as verification only, you need to talk to me directly to make arrangements for late assignments.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student