

Environmental Catastrophes, Tipping Points, and Challenges
GEO 4938/6938 & LAS 4935/6938
Wednesday periods 8-10 (3:00 – 6:00 PM), Room 376 Grinter
Office Hours: Tuesday, 1:00PM-3:00PM, Room 313 Grinter

Global Warming, Extinction Crises, Ocean Acidification. The newspapers and magazines are full of environmental doomsday prophecies, and this course will help you make sense of what's happening to our planet. We start with an overview of critical components of the earth's climate system that are on the verge of rapid change, with implications for all of us. What will happen to South Florida if sea level rises 10 feet? What will happen to communities on the North Atlantic if the Greenland Ice Sheet slides into the ocean and drifts away? How far will the 6th extinction proceed? After a broad overview of the scientific issues, we will focus on two parts of the world that have experienced a great deal of environmental change, namely the Amazon Basin and the State of Florida. With a well-grounded empirical sense of what we're up against as a society, we will then address both mitigation and adaptation, taking a social science perspective to understand current policies aimed at helping us survive the Anthropocene. This will lead us to the IPCC reports and various United Nations publications addressing new global initiatives, such as those aimed at reducing carbon emissions from deforestation and forest degradation (UN-REDD). How do we transition to a low carbon footprint as a global society? What works best, carbon markets or government regulation? Is the Paris Climate Agreement up to the tasks it has set for the global community? These are critical questions addressing the big challenges we all face in an interconnected world where the actions we take often have unexpected consequences.

Course Materials: The course materials are mostly assigned readings, to be completed prior to each class. Two books are required.

Required: Kolbert, E. (2014). *The sixth extinction: an unnatural history*. A&C Black.

Required: Kolbert, E. (2021). *Under a White Sky: The Nature of the Future*. Penguin.

Class preparation: The class is to be conducted in a seminar format, which means you are expected to be prepared for each class session. Preparation includes not only reading the assigned materials, but also reflecting upon the readings and being able to discuss them intelligently.

Office hours: The instructor would like to get to know as many of you as possible, and encourages you to drop by during office hours (Tuesday 1:00PM – 3:00PM; Grinter Rm 313), or by appointment.

Email Policy: I do not use email to answer substantive questions. If you wish to discuss course materials, or assignments, please come by during office hours.

CANVAS Policy: I use CANVAS to distribute readings, not as a mechanism for informing students of their running grade totals.

Announcements: Class announcements (if any) will be made in class and distributed electronically. You are responsible for remaining informed.

Incompletes and Deferrals: Final grades will be submitted for all students during finals week. No grades of incomplete or deferral will be submitted for students without a medical excuse or family emergency.

End of Semester: I expect you to be in attendance the last day of class (April 18). In other words, don't plan to leave Gainesville before that date to do your fieldwork or research.

The grading scale is:

	Graduate	Undergraduate
A+	94-100	84-100
A-	90-93.9	80-83.9
B+	84-89.9	74-74.9
B-	80-83.9	70-73.9
C+	74-79.9	64-69.9
C-	70-73.9	60-63.9
D+	64-64.9	54-59.9
D-	60-63.9	50-53.9
E	Below 60	Below 50

The grades are given on the basis of three components

A. *Attendance and Participation* (40 points)

UF Policy: (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>)

Attendance and participation are mandatory. There is an expectation that each student will be prepared and will participate in class. You should not miss more than one class for any reason. Since this class meets once a week, missing a class is equivalent to three lecture periods. Excessive absences and poor participation will result in final grades being lowered. Excused absences are allowed and require appropriate documentation. Late assignments will be accepted with similar documentation. Students should arrange with the instructor for makeup material, and the student will receive one week to prepare for any makeup assignment, if circumstances allow it.

Points in class will be assigned primarily on the basis of discussions of the readings. Each week, several students will be selected to lead these discussions. This will involve a set of typed notes, prepared by the students, to be distributed in class, with at least five discussion points. The expectation is that the student team will prepare about two pages of notes touching on and highlighting the five discussion points; they, in turn, will lead the class discussion. I want to see a joint, collaborative product, i.e., one set of notes, and will pay attention to the extent to which students spark exchange and comprehension. The notes with discussion points are to be distributed at the beginning of class. Students who are NOT responsible for leading the discussion must develop 2 questions and deliver to me before the start of class.

If you choose to present in PowerPoint, it is your responsibility to be sure to have the computer up and running, and your data ready to go. The instructor is not an audio-visual technician.

B. *Reflection* (20 points)

I ask you to keep a journal, which I will have you hand in to me 4 times during the semester. In this journal, you will reflect on the state of the world, and in particular on your impressions of environmental changes you are personally aware of in your daily life. This could range from comments on the weather to complaints about the polluted nature of a body of water. It could also involve discussions about things you read in magazines or newspapers, see on the web, view on television, or talk about with your friends. I expect 2 pages of journal entry each time I take a look, which means you will be writing 8 or more pages through the course of the semester to document your reflections. I will not be spell-checking your journal entries, and do not have the same expectations as I do for the class paper. This is more or less an exercise, a type of homework meant to help you become more aware of the world you live in. Thus, my grading here will be rather loose, which is to say you can lose points only by failing to update your journal each time you turn it in. Each journal entry is worth 5 points.

C. *Class Paper* (40 points)

There will be one (1) class paper required for the course. The elements of this paper include a draft (10 points), presentation of the draft (10 points), final paper (10 points), and presentation of final paper (10 points). These elements are due at specified dates throughout the semester.

The class paper should be based on a topic of interest to you, and relevant to class materials.

Draft. Paper drafts, both graduate and undergraduate, must show that students have selected an appropriate topic, and have begun to organize their thoughts and to write logically. They must be at least 5-pages in length and consist of paragraphs organized in a logical fashion, with complete, grammatically correct sentences (page count does NOT include tables, figures, etc.) I also want to see several references (at least 5). These must be references to actual published materials, not simply webpages.

Presentation of Draft.

This should be about five minutes long, using PowerPoint and handouts as necessary.

Presentation of Final Paper.

This should be a more formal presentation, about 10 minutes long, allowing 5 minutes for questions and answers. The class this day will be conducted like a mini-conference, and other students may attend.

Final Paper.

Note to all, especially non-native English speakers: your final paper will be graded on content AND form. You are strongly encouraged to make use of peer review, university resources, and other resources, to ensure your paper reads well and is free of grammatical errors. If an excessive number of grammatical errors are found, you will lose points.

Plagiarism: Plagiarism is the appropriation of the words, ideas, or thoughts of another and representation of them as one's own original work. Notice the breadth of that definition. You must cite another author not only for direct quotations, but also for the use of *ideas* and for the

paraphrasing of another's work. To do a proper job of crediting your sources, it is not uncommon to have one citation for every two or three sentences of your paper.

Paper Expectations: Graduate Students

Your paper should be at least 15 pages in length (double spaced, 1" margins, Times New Roman with 12 point font) **excluding endnotes, references, figures, tables, etc.**, which should follow the 15 (or more) pages of text. Failure to meet the page limit will result in point loss.

Paper Expectations: Undergraduate Students

Your paper should be at least 7 pages in length (double spaced, 1" margins, Times New Roman with 12 point font) **excluding endnotes, references, figures, tables, etc.**, which should follow the 7 (or more) pages of text. I do not expect you to write something that could be submitted to a journal, but I do expect a grammatically clean, and well-structured exposition. Failure to meet the page limit will result in point loss.

Submission of work: Due dates for all assignments are in the syllabus. Papers are to be submitted electronically. Late papers will not be accepted except in the case of medical or family emergency.

SCHEDULE OF TOPICS AND READINGS

Week 1 Jan 3-7 Our own very special catastrophic time on Earth

Goodbye, Miami *Rolling Stone* Jeff Goodell June 20, 2013
<http://www.rollingstone.com/politics/news/why-the-city-of-miami-is-doomed-to-drown-20130620?page=5>

Week 2 Jan 10-14 Extinction, it's getting real First Journal Entry Due in Class

Kolbert, E. *The Sixth Extinction* Chapters 1-5

"The Sixth Extinction" "The Mastodon's Molars" "The Original Penguin" "The Luck of the Ammonites" "Welcome to the Anthropocene"

Week 3 Jan 17-21 How do we define Catastrophe?

Required: Lenton TM, Held H, Kriegler E, Hall JW, Lucht W, Rahmstorf S, Schellnhuber HJ. 2008. Tipping elements in the Earth's climate system. *Proceedings of the National Academy of Sciences* 105:1786-1793 doi_10.1073_pnas.0705414105.

Recommended: Lenton et al. 2011. Supplemental Online Materials; Lenton, Timothy M. "Early warning of climate tipping points." *Nature Climate Change* 1, no. 4 (2011): 201-209.

Week 4 Jan 24-28 Tipping Points: The Amazon Forest

Nobre, Carlos A. & Laura De Simone Borma. "Tipping points' for the Amazon forest." *Current Opinion in Environmental Sustainability* 1, no. 1 (2009): 28-36.

Lovejoy, Thomas E., and Carlos Nobre. "Amazon tipping point." (2018): eaat2340.

Week 5 Jan 31- Feb 4 Global Warming and Climate Change Second Journal Entry Due in Class

Intergovernmental Panel on Climate Change (IPCC) Projections

Week 6 Feb 7-11 Global Warming and Climate Change

IPCC Projections, continued

Week 7 Feb 14-18 Habitat Transformation

Kolbert, E. *The Sixth Extinction* Chapters 6-9

"The Forest and the Trees" "Islands on Dry Land" "The Sea Around Us" "Dropping Acid"

Week 8 Feb 21-25 Habitat Transformation

Kolbert, E. *The Sixth Extinction* Chapters 10 – 12

"The New Pangaea" "The Rhino Gets an Ultrasound" "The Madness Gene"

Week 9 Feb 28-Mar 4. Class Draft Presentations and Discussion

Week 10 Mar 7– Mar 11 SPRING BREAK

Week 11 March 14 - March 18 What have we done to the Earth? The case of Amazonia Third Journal Entry Due in Class

Walker, R.T. 2020. Collision Course: Development Pushes Amazonia Toward Its Tipping Point. *Environment: Science and Policy for Sustainable Development*, 63(1): 15-25.

Walker, R.T., Simmons, C., Arima, E., Galvan-Miyoshi, Y., Antunes, A., Waylen, M. & Irigaray, M., 2019. Avoiding Amazonian Catastrophes: Prospects for Conservation in the 21st Century. *One Earth*, 1(2), pp.202-215.

PRODES Maps of Amazonia, Population Census Data, Road Network

Week 12 Mar 21-25 What have we done to the Earth? The case of Florida Third Journal Entry Due in Class

Bartram *Travels of William Bartram* Part II Chapter IV – Part II Chapter VII pp 100-211.

Knight, R. *Silenced Springs* Chapters 1-5

"History, Ecology, and Significance of Florida's Springs" "The First Signs of Trouble" "Dying of Thirst" "Nitrate Nitrogen – An Ecological High?" "The New Normal"

Select Readings about Florida Bay and Reefs

Week 13 Mar 28 – Apr 1 The Global Situation Fourth Journal Entry Due in Class

Intergovernmental Panel on Climate Change: 6th Assessment, In Press

Summary for Policymakers IPCC, 2021: Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [MassonDelmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

<https://www.ipcc.ch/report/ar6/wg1/#SPM>

Week 14 Apr 4 - Apr 8 The Response to date

The Paris Climate Agreement

Nationally Determined Contributions:

<https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx> For Brazil

Kolbert, E. *White Sky* Part 2: “Into the Wild”

Week 15 Apr 11 – 15

Kolbert, E. *White Sky* Part 3: “Up in the Air”

Week 16 Apr 18 – 22. Classes End Apr 20

Paper presentations, Discussion. Final Paper Due April 20

Course Policies and Useful Information:

Students Requiring Accommodations Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

Class Demeanor Students are expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Please avoid the use of cell phones and restrict

eating to outside of the classroom. Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all.

Materials and Supplies Fees There are no additional fees for this course.

University Honesty Policy UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conducthonor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class.

Counseling and Wellness Center Contact information for the Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.