



GEORGETOWN UNIVERSITY

Georgetown College

Department of Biology

Georgetown University's Department of Biology is seeking a substitute instructor for the spring 2024 and/or 2025 Global Climate Change Ecology course. This course gives a broad overview about climate change and its interaction with other major global drivers of environmental change (particularly land cover and agricultural practices). The course is separated into three sections: Global climate systems and a history of climate change on a geological timescale, impacts of climate on ecological dynamics at multiple scales and different complexities and levels of trophic interactions, and a primer on ecological forecasting. The course meets three days per week (M,W,F at 10am). There is substantial flexibility to shape the course to conform to an individual's focus and framework. The syllabus for 2021 is attached to provide an example of how it has been taught in the past (note that at that time, the class was taught with a lab, but that is being dropped going forward).

This is an excellent opportunity for a post-doctoral associate in the Washington, DC area to get experience developing and delivering a full course to undergraduates on a critical subject involving ecology, conservation and environmental science. The successful candidate will be paid \$7500 under contract for teaching the course. The spring 2024 Georgetown academic calendar can be found at: <https://registrar.georgetown.edu/academic-calendar/maincampus/>. In 2024, classes begin on Wednesday, January 10th and continue through April 30th. Final exams are scheduled from May 3rd through May 10th. There are two semester breaks: spring break (March 4-8) and Easter break (March 28-April 2nd). The schedule is similar for 2025.

Please contact Leslie Ries (leslie.ries@georgetown.edu) if you are interested in the position and would like more information. Candidates who could potentially teach the class in both spring of 2024 and spring of 2025 would be particularly preferred, but this is not at all a requirement.

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Washington, DC 20057-1229
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DRAFT Syllabus - Spring 2021 (4 credits)

SYLLABUS WILL BE UPDATED AND LIVE ON CANVAS

Scheduled classes: Monday/Wednesday/Friday 10am-10:50am

Lab: Monday 11:00am-12:50pm

Synchronous classes Monday 10am-12:50pm, Friday 10am-10:50am

Asynchronous content: available Tuesday-Thursday for Thursday evening online discussion posts (due by 8pmET)

Instructor: Leslie Ries (Leslie.Ries@Georgetown.edu)

Office Hours: Mondays 2-3pm and Friday 11-12pm or by appointment

Course Overview

Human activity has become so dominant a force on Earth that geologists are currently contemplating assigning a new epoch - the Anthropocene. At a global scale, our most consequential impacts so far have been changing land-use, carbon emissions, and pollution (especially related to agricultural run-off). In this class, we focus on understanding how these three human activities interact to profoundly change our environment and the ecology of our planet. During lectures, we will focus on the science of our changing environment with a broad sweep of the history of the planet's climate, our legacy of changes to the planet and the models the global community has developed to allow us to project how our activities are changing our abiotic environment and the potential responses of the ecological community. In our labs, we will do hands-on exercises to help highlight some of the dynamics of global change and also expose students to the techniques used to perform research in this field. To explore the social dimensions of climate change, each student will choose a recent article from the media that explores a topic of interest and write a brief summary for the class to prompt an on-line and an in-class discussion. Finally, each student will pick a topic of particular interest to them to write a term paper and make an oral presentation to the class.

Prerequisites: Foundations II –while Ecology is not required, it is recommended – the course will include a lot of ecological content

Course textbook: none but readings are assigned for each class

Course Goals

1. To understand the role that anthropogenic forces are playing in altering environments and ecosystems

2. To appreciate the links between physical, chemical, and biological systems, and the changes that may occur with anthropogenic forcing
3. To appreciate the interdependence and interactions between organisms in biological systems and how disruption to these systems may have cascading effects
4. To understand the ways in which communities and ecosystems respond to global changes
5. To understand how global climate models are created and used to make predictions about future climate conditions
6. To understand how predictions of future ecological dynamics can be made given multiple layers of uncertainty
7. To give students a broad understanding of an issue that is relevant to their lives
8. To directly engage students with the primary literature in global change research
9. To enhance student ability to communicate science and debate scientific issues via oral and written forms

Class structure and activities

This class has three one-hour lectures and one two-hour lab each week. Important expectations for my students:

- Participation is important, so showing up is vital to success.
- I strive for a class where everyone is comfortable sharing their opinion, so please be respectful in your discussions and also by paying attention to anyone who is talking.
- Please review the reading and lecture materials *before* class. Some material may be updated right before class, but all readings (and draft powerpoint presentations) will be posted by Friday of the preceding week.

In addition to traditional lectures, in-class discussions and lab activities, there are two structured activities that will also be part of your grade.

1) Media blogs: Each student will identify a story in the media with relevance to social, political or economic dimensions of climate science within three broad topic themes:

1. The public's response to and understanding of climate science, impacts and/or policy
2. Climate refugees and international politics
3. Climate change and disease (articles on covid are fine but then you probably should check with your fellow bloggers to make sure you haven't chosen the same article).

The media blogs for each theme will be due during three separate periods. Students will volunteer (or be assigned) to post a media blog under one of the above themes.

- Initial posts (10 pts): Media blogs are posted initially on Canvas in a discussion forum by Thursday night at 11:59pm of the assigned week and should be between 200-300 words. You can't post on the same article, but you can go back as far as 2 years to find an interesting article. Original articles should be "long form" and not just be a brief recap of a paper just published, which are often just the publication of verbatim press releases from the original study's authors and/or institution. Alternatively, you can aggregate more than one article on the same theme, and then those can be shorter. Your "blog" should be written to capture your reader's attention, so choose an interesting article and highlight the most engaging aspects, especially those pertinent to our class. Highlight 2-3 assertions in your article that you think may be worthy of "fact-checking".

- Responses (3 pts each round): Each student (including bloggers) should read each blog. You will have until Sunday night (8pm) to post a comment on at least two of the blogs during each of the three rounds of media posts. Focus particularly on assertions in the blogs (or original articles) that you think may be worthy "fact checking".
- Discussions (part of class participation grade): The following Monday we will discuss the blogs before starting that week's lab. During the discussion, we will decide as a class what the most interesting assertions are that should be fact-checked by that week's bloggers.
- Bloggers then need to fact check their assigned assertion (they may all be assigned the same or different assertions depending on the class discussion). Bloggers must then post a new blog by Thursday at 5pm summarizing their fact checks (10 pts), then comment on the fact-checking of their fellow bloggers and respond appropriately to any posts by midnight(6 pts). Only those group bloggers need to participate (although others are welcome to!).

2) Research paper: Students will be required to choose a topic and develop a 1750-2000 word research paper and associated presentation for the class. You will choose a system of interest and, using future climate scenarios and your knowledge of your focal system (based on a literature review), make some predictions about how your system might change in the future. You will develop a detailed research topic proposal (which must be approved) that contains a summary, annotated bibliography and an outline of your paper (5 pts). You will turn in a summary of your study system that will ultimately become the first half of your paper (20 pts). You will have an opportunity to turn in a draft (for 1-5 bonus points). Later, you will develop a framework to make predictions about your particular study system into the future. Your first opportunity to synthesize and present your entire story will be a short presentation for the class (25 pts). You will base your final paper on this presentation (and feedback). You are encouraged to turn in a draft for comments before the final paper is due (50 pts). In total, this research project will contribute 100 pts (one quarter) to your total course grade.

Note that I do use "Turnitin" to check for verbatim text. We will discuss plagiarism in class – and how to avoid it.

Grading

Activity	Points	Comment
Exam I	40	
Exam II	50	
Exam III	60	
General class participation (Unit I,II,III)	5 (I) 15 (II)	Participation in class: <ul style="list-style-type: none"> • Showing up (camera on): 20% • Ask-a-question/answer-a-question: 40%

	20 (III)	• Participating during class: 40%
Research paper - proposal/outline	5	A well-developed proposal with annotated bibliography and outline
Preliminary research write-up	20	This write up will introduce system and review known global drivers for your system
Research presentation	25	A 10 minute presentation for the class
Research paper - final	50	You have the option of giving me a first draft that I will comment on
Media posts - initial posts	10	10 points for original post
Media responses	9	3 points for each round of responses
Media posts - verification of assertion	16	16 points for posted verification of assertion (and online discussion)
Lab portion	75	See syllabus for individual assignments and points
Total	400	

Late assignments will be penalized 5% of the total assigned points per day unless you make arrangements with me ahead of time - but note that I always try to be very flexible in terms of working with students if they are falling behind. However, I also don't want work to pile up for you or me! Please stay in close contact if you are struggling with keeping up on the assignments for this class, and we will work together!

Please present all requests for regrades in writing within one week of receiving graded assignment or exam.

Final grades for the semester will be assigned as follows (grades will be rounded to the nearest 0.1): A= 93.3-100%; A-= 90-93.3%; B+= 86.6-90%; B= 83.3-86.6%; B-= 80-83.3%; C+= 76.6-80%; C =73.3-76.6%; C-=70-73.3%; D+= 65-70; D= 60-65%; F=<60.

Course Summary:

Date	Details
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Calendar Event [1a.Lecture: Class Introduction](#)

Date	Details
Mon Jan 25, 2021	Calendar Event 1.Lab: Introduction
Wed Jan 27, 2021	Calendar Event 1b.Lecture I: Greenhouse gasses and the carbon cycle
	Calendar Event 1c.Lecture II: Climate change science (1850-present)
Fri Jan 29, 2021	Calendar Event 1d.Discussion
Mon Feb 1, 2021	Calendar Event 2a.Lecture: Landuse change, cover and climate interactions
	Calendar Event 2.Lab: Carbon model exercise
Wed Feb 3, 2021	Calendar Event 2b.Lecture: Land-use part II
	Calendar Event 2c.Lecture: Global nutrient pollution
Fri Feb 5, 2021	Assignment Lab due: Carbon model
	Calendar Event 2d.Discussion
Mon Feb 8, 2021	Calendar Event 3a.Lecture: Ocean changes: temperature, pH and the global conveyer belt
	Calendar Event 3.Lab: Vostock Ice Core Lab
Wed Feb 10, 2021	Calendar Event 3b.Lecture: Tipping points
	Calendar Event 3c.Review for Exam I
Fri Feb 12, 2021	Assignment Lab due: Vostock Ice
Sun Feb 14, 2021	Calendar Event 3d.Discussion
	Assignment Class participation - Unit I

Date	Details
Mon Feb 15, 2021	Assignment Exam I
	Calendar Event 4.Lab: Ecology Review and Population Modeling in R
Wed Feb 17, 2021	Calendar Event 4bc.Lecture Introduction to Unit II and Thermal constraints
	Assignment Lab due: Population modeling
Thu Feb 18, 2021	Assignment Initial Media Blog Group I: The public's response to and understanding of climate science, impacts and/or policy
Fri Feb 19, 2021	Calendar Event 4d.Discussion
	Calendar Event Group I media blogs due
Sun Feb 21, 2021	Calendar Event 8:00pm, Deadline to post response to Group I media blogs
Mon Feb 22, 2021	Calendar Event 5a.Lecture: Direct and Indirect impacts of temperature
	Calendar Event 5a.Lab: Phenology lab, Part I
	Calendar Event 5b.Lab: Media I blog discussion
Wed Feb 24, 2021	Calendar Event 5b.Lecture: Introduction to GDD Models
	Calendar Event 5c.Lecture: Phenology and Climate Change: Cherry Trees
Fri Feb 26, 2021	Calendar Event 5d.Discussion
Mon Mar 1, 2021	Calendar Event 6a.Lecture: Phenological mismatch
	Calendar Event 6a.Lab: Phenology lab, part II
	Calendar Event Lab: Phenology Lab, Part II (start)

Date	Details
Wed Mar 3, 2021	Calendar Event 6b,c.Lecture: Phenological mismatch II
	Assignment Lab due: Phenology, Part I
Thu Mar 4, 2021	Assignment Initial Media Blog Group II: Climate refugees and international politics
Fri Mar 5, 2021	Calendar Event 6d.Discussion
Sun Mar 7, 2021	Calendar Event 8:00pm, Deadline to post response to Group II media blogs
Mon Mar 8, 2021	Calendar Event 7a.Lecture: Community responses to climate change (I)
	Calendar Event Lecture: Media Blog Post II Discussion
Wed Mar 10, 2021	Calendar Event 7bc.Lecture: Community responses to climate change II
Fri Mar 12, 2021	Calendar Event 7d.Discussion
	Calendar Event 8a.Lecture: Adaptive responses to climate change
Mon Mar 15, 2021	Calendar Event 8a.Lab: Lake responses to nutrient addition
	Calendar Event 8b.Lab: Eddie lake module (A only)
Tue Mar 16, 2021	Assignment Research topic due
Wed Mar 17, 2021	Calendar Event 8b.Lecture: Adaptive responses of coral reefs (cont.)
	Calendar Event 8c.Review
Fri Mar 19, 2021	Calendar Event 8d.Review for Exam II
Sun Mar 21, 2021	Assignment Class participation - Unit II

Date	Details
Mon Mar 22, 2021	Assignment Exam II
	Calendar Event NO LAB!!!
Wed Mar 24, 2021	Calendar Event NO CLASS!!
Fri Mar 26, 2021	Calendar Event Spring break
Mon Mar 29, 2021	Calendar Event Spring break
Tue Mar 30, 2021	Calendar Event Spring break
Wed Mar 31, 2021	Calendar Event Spring break
Thu Apr 1, 2021	Calendar Event Spring break
Fri Apr 2, 2021	Calendar Event Spring break
Mon Apr 5, 2021	Calendar Event 11a.Lecture: Intro to Unit III (Macrosystems ecology)
	Calendar Event 11b.Lab: Eddie lake module (B,C)
	Calendar Event 11b.Lecture: Intro to Unit III (Climate projections)
Wed Apr 7, 2021	Calendar Event 11c.Lecture: Phenology and pheno-mismatch revisited
	Assignment Lab due: Lake Eddie Module
Thu Apr 8, 2021	Assignment Initial Media Post Group III: Climate change and disease
	Calendar Event 11d.Discussion
Fri Apr 9, 2021	Assignment Draft of Initial Research Report (1-5 bonus points)

Date	Details
Mon Apr 12, 2021	Calendar Event 12a.Lecture: Correlative SDMs
	Calendar Event Lab: Maxent exercise
Wed Apr 14, 2021	Calendar Event 12b.Panapto lecture: Correlative SDMs, cont.
	Calendar Event 12c.Lecture: Mechanistic SDMs
Thu Apr 15, 2021	Calendar Event 8:00pm, Deadline to post response to Group III media blogs
Fri Apr 16, 2021	Calendar Event 12d.Discussion
	Calendar Event Zoom discussion: Media III blogs
Sun Apr 18, 2021	Assignment Initial Research Report due
Mon Apr 19, 2021	Calendar Event 13a.Lecture: An introduction to forecasting
	Calendar Event Lecture: Introduction to penguins and monarchs
	Calendar Event Lab: Maxent II
Wed Apr 21, 2021	Calendar Event Lecture: Forecasting penguin responses to climate change
Thu Apr 22, 2021	Calendar Event Ask-a-question/answer-a-question
Fri Apr 23, 2021	Calendar Event 13d.Discussion
Sun Apr 25, 2021	Assignment Lab due: Maxent
Mon Apr 26, 2021	Calendar Event 11a.Lecture: Special lecture on Covid-19
	Calendar Event Lab: Georgetown phenology - final lab

Date	Details
Wed Apr 28, 2021	Calendar Event 14ab.Lecture: Forecasting monarch responses to climate Assignment Lab due: Phenology, part II
Fri Apr 30, 2021	Calendar Event 14d.Discussion
Sat May 1, 2021	Calendar Event Field trip: Calvert Cliffs
Sun May 2, 2021	Assignment Discussion thread evaluations posted
Mon May 3, 2021	Calendar Event 15a: Student Presentations
Wed May 5, 2021	Calendar Event Panopto Review for Exam III Calendar Event Zoom review (live) Calendar Event Zoom review (live)
Thu May 6, 2021	Assignment Class participation - Unit III
Fri May 7, 2021	Calendar Event Exam III
Mon May 10, 2021	Calendar Event Study days
Tue May 11, 2021	Calendar Event Study days
Wed May 12, 2021	Calendar Event Turn in paper draft (optional)
Wed May 19, 2021	Assignment Due: Final Research Paper