

Syllabus for Biology 263 (W): Biological Responses to Climate Change Spring 2021

Professor: Kathleen Donohue

Contact information: k.donohue@duke.edu

Class time: Tu-Th 12:30-1:15

Reader Requirements

Readers should have professional experience in the fields of Ecology, Environmental Science, Conservation Biology, or Evolutionary Biology/Ecology. They should be frequent readers of the literature in these fields and ideally have some experience in reading research grants in these fields.

Course Description

Climate change is happening now. This seminar, combined with short lectures, will focus on how organisms, populations, and biological communities are expected to respond to climate change. While reading the primary literature, we will discuss evidence for effects of climate change on organisms, how to experimentally test for potential effects of climate change, and the ecological and evolutionary mechanisms that organisms have--or do not have--that enable them to respond to climate change.

Student Writing Assignments

Assignment 1: "Ramifications" paper.

Papers should be 600-1000 words, excluding references (4-8 recommended).

This assignment describes the ramifying effects of climate change. Humans rely on other life forms to sustain human health, economy, and culture. The purpose of this assignment is to explore how diverse organisms potentially effect humans, directly or indirectly, and how effects of climate change on those organisms may also affect humans. **Starting with one well documented effect of climate change on a single organism, your challenge is to describe how the response of that organism ultimately has consequences for other organisms, including humans.**

Try to find evidence to support each link in causality, from the focal organism to the final outcome that influences human society. Some links will have more evidence than others, and you may even want to conjecture about some of the links. However, be transparent about which links are well substantiated, and which are more speculative. If you have artistic leanings, consider including images or other media within your paper to convey your message. Although the assignment is a writing assignment, you are free to experiment with different ways to communicate about human dependency on natural systems and how climate change may affect them.

Assignment 2: Grant proposal.

Students will write a final term paper in the form of a grant proposal to test some aspect of biological responses to climate change. They will turn in two drafts of this paper throughout the semester, and these drafts will be peer reviewed. Only final versions will be graded. These grants will be in the form of an NSF Graduate Research Fellowship application, although I will allow up to 4 single-space pages, including references. These proposals should include a Background section that clearly articulates the background information to motivate the research and clearly states specific hypotheses to be tested; a Methods section that presents the experimental design used to test the hypotheses; a section on Potential Outcomes that articulates potential results and how those results would be interpreted in terms of the stated hypotheses. Grant proposals will be graded according to the strength of the motivation for the research, the quality of the hypotheses being tested, the appropriateness of the methods used to address the hypotheses, and the clarity with which the student relates the methods to the hypotheses and interprets possible outcomes.

Schedule:

Ramifications paper

- 2/4: Turn in first idea for Ramifications paper to Professor
- 2/16: First draft of Ramifications paper due to READERS
- 2/23: Turn in peer reviews of Ramifications papers
- 3/2: Final draft of Ramifications papers due; share with READERS

Grant proposal

- 3/16: Turn in first idea for Grant Proposal to Professor
- 3/30: First draft of Grant Proposal due to READERS
- 4/6: First draft of Grant Proposal due for review to class
- 4/13: Turn in peer reviews of Grant Proposals
- 4/20: Turn in revised draft to READERS
- 4/30: Final papers due to class; share with READERS