

Complexity, climate change and human systems

HCOL 185E SU (3 credits)

Fall 2016 Tuesday / Thursday 11:40-12:55 (Jeffords 326)

Instructor: Brian Beckage (Brian.Beckage@uvm.edu)

Office Hours (Jeffords 345): Tuesday 10:30-11:30 am;

Thursday 1:00-2:00 pm

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Course Description

The earth is a complex coupled human-natural system that is increasingly dominated by human activities. We will examine the nature of global climate change including its causes, mechanisms, and ecological impacts. The course will emphasize climate change as part of an integrated earth system that includes impacts on and feedbacks from human systems. We will consider the challenges and interactions between climate change and human societies by considering responses of current and past societies to climate change and environmental degradation. The class will emphasize readings, discussions, and activities to understand the scientific and social basis of contemporary climate and environmental change. Students will help develop an integrated conceptual model of the earth system as a coupled natural and human system.

Course Goals

To understand and engage key concepts and methodologies in climate change science.

1. To use this knowledge to analyze the responses of current and past societies to climate change.
2. To synthesize and integrate this knowledge and understanding in the development of a conceptual and simulation model of the feedbacks between climate and human systems.

Achieving these goals will require:

- Completion of assigned readings
- Attendance and participation in classroom discussions
- Research into human and climate system components
- Writing and synthesis of research results
- Group work in integrating research results into a conceptual model

Grading

Student grades will be based on the following four components:

1. A research paper on some aspect of the coupled climate and human system. This paper will include development of and results from a simulation model built in NetLogo. This paper and model will be due during the exam period at the end of the semester (40% of final grade).
2. A corresponding class presentation on this same research paper given during the final week of class. The presentation should be in an electronic format (i.e., powerpoint, keynote, or similar presentation software). (20% of final grade)
3. In-class evaluations (ICE) based on assigned readings. These will usually be short, weekly quizzes. (30% of final grade).
4. Student attendance and participation in class discussions and activities. Students are expected to attend class and fully participate in class activities and discussions. (10% of final grade)

Books and Media

This will be a seminar-style course consisting of in-class discussions and activities rather than lectures, and students are expected to participate actively in class. Students will also be assigned readings from the three class books (below) as well as from the popular press and the scientific literature.

These three books will be required for this class and are available in the university bookstore:

- Kerry A. Emanuel. 2013. What we know about climate change. MIT Press. Second edition. 120p. ISBN-13: 978-0262018432; ISBN-10: 0262018438. [Link to publisher.](#)
- Jared M. Diamond. 2011. Collapse : how societies choose to fail or succeed: Revised edition. Penguin. 608p. ISBN-10: 0143117009; ISBN-13: 978-0143117001 [Link to publisher.](#)
- Steven F. Railsback and Volker Grimm. 2011. Agent-Based and Individual-Based Modeling: A Practical Introduction. Princeton University Press. NY. 352p. ISBN: 9780691136745. [Link to publisher.](#)

We will also watch a variety of documentaries and other videos during class: These will include [An Inconvenient Truth](#) , [The Great Global Warming Swindle](#) and [A Crude Awakening: The Oil Crash](#).