

# Biology 3460: Global Environmental Issues

## JTB 310

Dr. William Anderegg

Welcome to Global Environmental Issues. Global changes are occurring that impact biological systems. In this course, we will study the impacts of globalization, climate change, altered hydrologic and nutrient cycles, land-use changes, introductions of non-native and invasive species, and other human-related activities on the Earth's biological and ecological systems. Emphases are placed on evaluating information; understanding linkages between biological and physical processes; the impacts of humans on the functioning of ecosystems; and consideration of both impacts and solutions to the challenges of global changes. Current global issues, such as climate, biodiversity, sustainability, and ecosystem goods and services are examined from a scientific basis with the goals of understanding impacts and proposed solutions that will influence both natural systems as well as human societies in the 21<sup>st</sup> century and beyond. I hope that this course will be enjoyable and informative to you.

The course is 3 credits and includes a community engaged learning (CEL) component, with Amy Sibul. Amy is in charge of the CEL portion of the class; therefore, questions regarding CEL shall be directed toward her. This includes questions on notes, partners, hours, and CEL breakouts. This class has no pre-requisites. It fulfills the University of Utah International Requirement (IR) and Physical/Life Science Exploration (SF).

### ***Aims***

We aim for students to develop skills in:

*Critical thinking:* Learn to think critically about environmental issues, develop a toolbox of techniques to critically evaluate evidence and multiple perspectives, understand the scientific method and its importance

*Agency:* Get engaged in the community and help improve the community's environment

*Vision:* Get inspired and think deeply about what a sustainable, equitable, positive future would look like and develop strategies to implement that future

### ***Lectures***

This course does not use a book because of the broad spectrum of topics. Educational information is based on what you learn in class; therefore, it is necessary to attend. If you do not come to class, you will miss the learning component and opportunities to enhance your critical thinking through interactive activities. The lecture slides will be posted on Canvas following the lecture. ***Required readings are posted online and should be read prior to class.*** Exams and in-class activities will cover the material in

readings. Lectures will include active-learning, such as small group discussions, think-pair-share, and numerous opportunities for participation.

### ***Expected Learning Outcomes***

In this course, students will practice and enhance their: 1) ability to apply the process of science, 2) ability to participate in the interdisciplinary nature of science through clear communication and collaboration with other disciplines, and 3) ability to explain the relationship between science and society, and engage others. Students will also gain a stronger understanding of evolution and systems biology. More detailed information on these can be found at <http://learningoutcomes.utah.edu/degree/296>

### ***Meeting Times***

Lecture: Tuesdays and Thursdays, 9:10 – 10:30 a.m., JTB 310

Breakouts: 12/5 rooms: TBD

### ***Instructor***

**William Anderegg**, Ph.D., [anderegg@utah.edu](mailto:anderegg@utah.edu). Office hours: Tuesdays and Thursdays 10:30 – 11:00 a.m., or by appointment, in South Biology (SBB) room 210B. I will be available and respond to emails between 8 AM – 4 PM weekdays.

### ***Community Engagement Coordinator***

**Amy Sibul**, M.S., [Amy.Sibul@utah.edu](mailto:Amy.Sibul@utah.edu), 801-585-7472; Office: Biol-086, basement floor of main biology building

### ***Teaching Assistants***

Bridget Dorsey: [u0948154@utah.edu](mailto:u0948154@utah.edu)

Austin Green: [austin.m.green@utah.edu](mailto:austin.m.green@utah.edu)

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Jack Temme: [u0336160@utah.edu](mailto:u0336160@utah.edu)

- TAs can also be reached via class Canvas page

### ***Course Materials***

This class is based on material presented in lecture and required readings posted on Canvas. There is no textbook. Grades will be posted on Canvas.

For your participation grade and active learning activities in class, a TurningPoint clicker or mobile phone app is required. You must have your license activated and functioning by class on Sept 3.

### ***Course Work***

Lecture exams 50%

Community Engaged Learning 25%

Class participation 15%

Short writing assignment 10%

### **Grading**

Assignments are due *no later than the beginning of class* on the due date, unless otherwise noted. Late assignments will be penalized 10% for each day they are late (this includes being late to class on the due date). Any concerns about scores on assignments and exams must be addressed within ONE WEEK of the graded work being returned to you or posted on Canvas. Course grades will not be curved, but the percentage point cutoffs for letter grades will be determined at the conclusion of the semester based on student performance. Cut-offs will be no greater than the following:

A+ 97-100%, A 93-96, A- 90-92, B+ 87-89, B 83-86, B- 80-82, C+ 77-79, C 73-76, C- 70-72, D+ 67-69, D 63-66, D- 60-62, E/F <60%

### **Course Work Details**

#### **Lecture Exams**

There will be three exams throughout the semester. They will not be cumulative. Topics covered in the formal lecture period will be used to create the exams. The majority of the questions will be multiple choice. Be prepared to think critically and synthesize ideas and concepts, rather than just regurgitating information. There will be no make-up exams. All exams will be on Canvas only during the class period, and thus can be taken from anywhere with internet access, and will be open-note. You will have one week from the time a graded exam is returned to discuss its scoring with the instructor.

#### **Class Participation**

Class attendance and participation is crucial for succeeding in this course and thus constitutes 15% of your final grade. Class participation will be graded by short in-class assignments that you will hand in (5% of your total grade) or via questions you will answer with your clicker in class (10% of your total grade). These will not be announced ahead of time. Your clicker participation grade will be based on your 10 best participation assignments; however, more than 10 will be collected. Thus, you can still get full participation credit if you miss one lecture. **There are no options for making up missed participation points. It is your responsibility to get your clicker working early in the semester (by Sept 3).** If you are present but for some reason do not click in for a given day, come to me that day after class, show me your notes from class, and send me an email that you were present. If you are unsure if your clicker is working, contact Turning Point student support at <Support@turningtechnologies.com>. **Class attendance/participation will be graded on guest lecture days and CEL meeting days.**

#### **Short Writing Assignment**

The writing assignment below is designed to provide experience with global change issues. You will be required submit the assignment on Canvas before the beginning of class on the due date. Assignments turned in after class on the due date will be considered late. These reports must use proper grammar and should clearly articulate your findings from the exercise. The assignment will be graded according to the rubric posted on Canvas.

**Prompt:** Select a specific effect/impact of climate change that is relevant to your own life and interests. This impact can come from course examples or from your own research. Write a three-page (double-spaced) paper that describes 1) the science of how climate change drives or influences your impact, 2) the observed and projected changes in this impact in the future (what is the outlook in 2030-2050 and 2100?), 3) the ecosystems and people affected by this impact, 4) the potential for and barriers to adaptation and 5) your proposal about what should be done to ameliorate this impact (either in adaptation or strategies to communicate this impact to different audiences to build support for climate mitigation). The paper should include a **literature cited section (single spaced) as the fourth page**, in which you list the academic journal articles, books, and reputable websites that you've referenced in the paper. Information on how to create this section can be found at <http://campusguides.lib.utah.edu/style>. You can also get help from a librarian, such as Amy Brunvand or Robin Reid. This is an exercise in critical thinking. Think of how lectures inform your understanding of the climate impacts and how they could be effectively addressed considering the current and future socio-political environment in the relevant areas of the globe. This assignment is worth 10% of your final grade.

**Classroom policy:** I aim to create a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.). To help accomplish this: 1) If you have a name and/or set of pronouns that differ from those that appear in your official University records, please let me know! 2) If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. 3) I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class that made you feel uncomfortable, please talk to me about it. For all of these, anonymous feedback is always an option.

**The Americans with Disabilities Act:** The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

**University Safety Statement:** The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training

resources, including helpful videos, visit [safeu.utah.edu](http://safeu.utah.edu).

**Addressing Sexual Misconduct:** Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

**Student wellness:** Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at [www.wellness.utah.edu](http://www.wellness.utah.edu) or 801-581-7776.

## Lecture Outline Fall 2019 (may change slightly)

Date	Lecture	Assignments due
<b>Setting the Stage for the Anthropocene</b>		
20-Aug	Introduction and Course Overview	
22-Aug	Human migration and megafauna extinctions	
27-Aug	Environmental science communication (Prof. Sara Yeo, UU)	
29-Aug	SLCL presentation + CEL Toolbox/Successes	
3-Sep	Two revolutions: Rise of agriculture and the industrial revolution	
5-Sep	CEL group meetings	
10-Sep	Drivers of global change	CEL prospectus
<b>Environmental Changes on the Land</b>		
12-Sep	Land-use change and deforestation	
17-Sep	Invasive species	
19-Sep	Land management and urban planning	
24-Sep	Exam 1	Exam 1
<b>Environmental Changes in the Water</b>		
26-Sep	Over-fishing and pollution in oceans	
1-Oct	Ocean acidification	
3-Oct	Global water resources	
15-Oct	Ecosystem impacts of Utah water policies & projects- Zach Frankel (Utah Rivers Council)	
17-Oct	CEL meeting 2	
<b>Environmental Changes in the Atmosphere</b>		
22-Oct	From particles to people, why Utah struggles with air quality and how this affects human health- Prof. Kerry Kelly (University of Utah) & Prof. Robert Paine (University of Utah)	
24-Oct	Climate change science	
29-Oct	Climate change impacts on ecosystems	
31-Oct	Exam 2	Exam 2
5-Nov	Climate change impacts on western US forests and agriculture	
7-Nov	CEL meeting 3	
12-Nov	Climate change impacts on society	Assignment 1 due
14-Nov	Geoengineering	
<b>Future Earth: Strategies and solutions</b>		
19-Nov	Strategies to address climate change	
21-Nov	Environmental policy in the 21st century (Robin Craig; Law School)	
3-Dec	Integrated strategies for wicked problems	
5-Dec	In-class CEL presentations	CEL project
	FINAL EXAM: Monday, Dec 9th 8-10 AM	Final exam