

Exploring sustainable human-environment interactions with  
Case studies highlighting the role of soils in maintaining environmental quality

**Instructor:** Jason Kaye; office: ASI 416; phone: 863-1614; e-mail: jpk12@psu.edu

**Teaching assistant:**

**Office hours:** Kaye, T and Th 2:15 to 2:45 pm in ASI 416, or by appointment  
Assistant, W 1:00-3:00 pm in ASI 406 or by appointment

**Schedule #:** 383431      **Credit:** 3 hours      **Prerequisites:** None

**Regular meeting time and location:** T and Th 1:00-2:15 in 102 Forest Resources Building

**Optional Text:** Environment: The science behind the stories by Withgott and Brennen

**Required Text:** The Earth remains forever by Rob Jackson

**Other Required Reading:** Class handouts and papers assigned during the semester from Angel.

**Website:** I will use the course ANGEL site to communicate with students and post assignments

**Introduction:** This is a course about how people interact with the environment. For millennia, human-environment interactions have been shaped by the quest for food. This is still true today. But the modern quest is especially interesting because we are attempting an extraordinary feat - feeding 6.8 billion people. There can be no doubt that feeding the growing population requires tradeoffs between people and environmental health. Sustainability offers a framework to think about these tradeoffs by considering the needs of current society as well as the long-term costs for future societies and the environment. This class provides an introduction to the concept of environmental sustainability for students with no background in environmental science or soils.

**Course goals:** The goal of the course is to develop critical thinking skills related to sustainable environmental choices. As we explore the concept of sustainability, we will discover the role of soil in mediating human-environment interactions by determining natural plant and animal abundance, supporting agriculture, and buffering the environment against pollution.

**Specific course objectives:** Students will complete the class with: 1) a survey of the key issues in environmental sustainability, 2) exposure to current scientific information related to these issues, 3) an enhanced ability to interpret environmental data, 3) an increased knowledge of the role of soils in maintaining environmental quality, 4) a significant depth of knowledge about “what it takes” to feed 10 billion people while maintaining a healthy environment.

**More on the course structure and my approach**

I intend to have fun teaching this class and it is my hope that students will have fun as well. I have tried to structure the course with a variety of interactions between the students and instructor and among students. I expect that about 1/3 of class time will be occupied by “mini-lectures”. About 1/5 of the class will be spent on “sustainability walks” to see examples of sustainable environmental choices near campus. The rest of the class time will be spent on active learning, discussions, or exams. While we will review and interpret scientific concepts and data related to environmental sustainability, this will not be a highly technical class. The class will also discuss values, to understand how two people who look at the same scientific data can come to very different conclusions about what the data mean. In developing the material, I have tried to make sure that the course will not focus on a long list of the ways that people harm the environment.

## General Schedule:

This schedule will form the foundation for the course, but may change in response to student input and weather. This is especially true for the “sustainability walks” because we don’t want to take those in the rain. The exam dates and essay due dates will not change.

Date	Topic	Reading WB = Withgott and Brennan, 2 <sup>nd</sup> ed	Assignments
<i>Theme 1: The science of nature and the nature of science</i>			
Jan 11	Ways of knowing nature	WB 1	Expectations due online Jan 14 <sup>th</sup>
Jan 13	Ways to value nature	WB 2	
Jan 18	Knowing/valuing soils	WB 9	<b>HW1:</b> Boloney detection due Jan 21 <sup>nd</sup>
Jan 20	Walk: Soil monoliths		
<i>Theme 2: Population and consumption: challenges to sustainability</i>			
Jan 25	Population	WB 8 & pages 136-138	<b>HW2:</b> Your footprint due Jan 28 <sup>th</sup>
Jan 27	Consumption: energy, carbon	WB pgs 104-106;195-196	
Feb 1	Consumption: footprint	WB 19 & pages 598-599	<b>Essay 1:</b> Living with Success due Feb 4 <sup>th</sup>
Feb 3	Walk: green building		
Feb 8	Plant/soil Experiment		
Feb 10	<b>Exam 1</b>		
<i>Theme 3: The Malthusian dilemma: feeding billions of people</i>			
Feb 15	Origins of agriculture	WB 10 & pages 71-75	<b>HW3:</b> Web soil survey due Feb 23 <sup>th</sup>
Feb 17	Green revolution		
Feb 22	Ag & the global N cycle	WB 10, 100-101, 118-124	Mid-semester course evaluation online Mar 2 through Mar 7
Feb 24	GMO/Tillage/Pesticides		
Mar 1	Meat & Soil biota lab	WB 300-304	Mid-semester course evaluation online Mar 2 through Mar 7
Mar 3	Organic ag		
Mar 8	Spring Break		
Mar 10	Spring Break		
<i>Theme 4: The conservation dilemma: maintaining a healthy environment</i>			
Mar 15	Species conservation	WB 11, 5, pages 66-70	<b>Essay 2:</b> Richness of life due Mar 16 <sup>th</sup>
Mar 17	Harvest plant/soil experiment		
Mar 22	Walk: an ag soil	WB 7,9	<b>HW4:</b> Soil biota lab due Mar 25 <sup>th</sup>
Mar 24	<b>Exam 2</b>		
Mar 29	Ecosystems, Biomes, Soils		
Mar 31	Ecosystems, Biomes, Soils		
<i>Theme 5: Success stories in sustainable science and policy</i>			
Apr 5	Walk: forest carbon/change	WB parts of 15,17	<b>HW5:</b> Plant/soil lab results due Apr 6 <sup>th</sup> <b>Essay 3</b> Ozone Awareness due Apr 8 <sup>th</sup>
Apr 7	Clean air acts	WB 18	
Apr 12	Climate change: science		
Apr 14	Climate change: policy		
Apr 19	Walk: A forest soil	State of the Bay 2005	
Apr 21	Chesapeake Bay		
Apr 26	Dust bowl & soil cons.		<b>Essay 4</b> Changing Earth due Apr 27 <sup>th</sup>
Apr 28	Walk or catching up...		
<b>Final Exam</b>	A take-home, open book exam, due at the end of the time scheduled for the final.		

## Grading scheme

The course grade will be determined by four types of assessment

1. Exams: 3 worth 10 % each = **30 %** of course final grade
2. Essays: 3 worth 10 % each = **30 %** of course final grade
3. Class participation = **20 %** of course final grade
4. Homework: five worth 4% each = **20%** of course final grade

The specific grading approach for each of these four assessment types is outlined here:

1. **Exams.** Exams will include a variety of question types (multiple choice, short answer etc.). On the exams, the value of each question will be clearly noted beside that question. A study guide will be handed out at least one class period prior to the first two exams and exam questions will be drawn from the material highlighted in the study guide. The first two exams will be in class and closed book. The final will be an open-book take home exam and there will be no study guide.
2. **Essays.** The essays should be a personal response to the assigned reading in Jackson's book (*The earth remains forever*). Rob Jackson is an internationally respected ecosystem scientist, but in this book he is trying to reach people who have become disenchanted with the environmental movement. The author is walking the line between scientist and advocate. The book is a mix of scientific analysis and Jackson's personal reflection on the state of the environment. I would like your essays to follow this model. The essays should be personal reflections, but they should also reflect that you are thinking deeply about the information at hand – that is, the information presented in Jackson's book and in class. You are free to respond to any of the points made in the book. While the essays should be personal, they should NOT be written as a stream-of-consciousness. You should develop a structure for the essay so that it conveys a clear and succinct message. Follow the adage: "say what you are going to say, say it, say what you have said." It is very important to me that you have a clear thesis statement in the first few sentences of the essay that identifies the main theme(s) that you will be writing about (this is the "say what you are going to say" part). It is also important that your essay develops an original thought – it would be inappropriate to simply summarize the reading. The essays can be anywhere from 1 to 3 typewritten, single-spaced pages, and as long as you are within these guidelines length will not be a factor in the grade. Essays can only be turned in via ANGEL, paper copies will not be accepted. The book has 4 chapters, and I expect you to write essays on 3 of the 4. If you turn in 4 essays, I'll drop your lowest grade. Grading rubric for the essays will be as follows: F – no analysis of the reading, and no original thought developed; D – minimal analysis of the reading, and minimal original thought development; C – it is clear that you have engaged with and analyzed the reading and have developed an original and well organized response; B – all requirements for C are met, plus the essay displays an above average analysis of the reading OR an above average development of the original response; A – all requirements for B are met, but the essay displays an above average analysis of the reading AND an above average development of the original response.
3. **Class Participation:** I hope to foster a classroom of active exchange among students and between students and the instructor. I will foster these exchanges through class discussions, active learning in groups, and sustainability walks outside the classroom. However, I can't create a conversation alone – you must all participate. Successful class participation requires preparation – students who are behind on the concepts will feel less confident participating in class. Successful class discussions also require the right atmosphere, we

must all remember to be courteous in our comments and criticisms and open to contrasting ideas from others. Remember to criticize ideas, not people. Occasionally I will ask you to prepare by reading or studying some graphs prior to coming to class. Finally, participation in class includes giving feedback to the instructor, and I expect all students to complete two (short) online surveys, one at the beginning of class and one in the middle of the semester. Grading rubric for class participation: A – Student initiates and facilitates discussion regularly by raising and responding to questions. To earn an A, students must occasionally (several times over the semester but not at every discussion) offer comments that provide new and interesting ideas that benefit the entire class, rather than simply following the lead of others. B – Student is well prepared and participates regularly and productively, but is not occasionally taking a leadership role in discussion. C – Student is generally prepared, but participates occasionally in discussions and mainly in response to ideas from the instructor or other students. D – Student is often unprepared for discussions and contributes infrequently. F – Students who do not participate will receive an F. By definition, if you miss class frequently you can not participate, and thus, will receive an F. This grade is also reserved for students that are frequently discourteous during discussions (by the way, I almost never see this).

4. **Homework assignments** will be graded to see that the assignment was completed and the grade will be either credit or no credit. If you hand in all of the homework assignments on time (and it is clear that you have completed the project in accordance with instructions) you will receive full credit for 20% of your grade. These assignments vary greatly, so instructions and due dates will be given at the time of the assignment.

### **University Academic Integrity Statement**

Academic integrity, as defined by University Faculty Senate Policy 49-20, is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabrication of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.

### **A comment on field trips**

The field trips in the class are always fun. Most students regard them as the best part of the class. However, walking in the woods and digging in the soil do present some challenges that are not an issue in the typical classroom setting. Be prepared to get dirty when we go on field trips. Please wear appropriate shoes. It is possible that you will get a tick, and you should make yourself familiar with lyme disease online or using the handout that is posted on angel (in the “other links” tab). Always check yourself for ticks following our field trips. In addition, if you have a significant allergy (e.g. to bees), please let me know immediately so you can be prepared.