

BI 120: Environmental Science (3 credits)
Jan Term 2017

Lecture: MTuWThF 1:00 – 4:00; Robinson 345

Instructor: Dr. Ryan Niemeyer

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Office Hours: MTuWThF 11:00 – 12:30 AM or by appointment

Course Overview

A healthy and functioning natural environment is central to human flourishing. But as with the aspect of the created order, how we interact with the natural environment is often a source of conflict. How we choose to be stewards of these resources is central to our survival as a species. To add to this challenge, many people who deal with environmental challenges fail to grasp the spiritual issues related to our interaction with the environment. From a Christian perspective, we are called to steward natural resources in a sustainable and equitable manner.

This course will include three units. The first unit will discuss environmental worldviews related to the environment. The second unit will examine “how the earth works” and thereby focus on biophysical (i.e. biological and physical) processes. The third unit will discuss how humans affect the environment and include several case studies.

This course is designed to engage students across multiple learning types. This class is “hands on” and requires active participation. While this class includes lectures, I will never lecture through an entire class. Instead, the course will include readings, in-class discussion, labs, and a hands-on project.

Learning Objectives

As a class that meets the *Natural Science General Education* requirement, this course will:

“... provide opportunities for students to understand and apply the scientific method as an analytical, problem-solving tool via coursework that emphasizes both theoretical and experiential components. They expose students to the strengths and weaknesses of scientific methodology and the relationship between scientific inquiry and faith.”

(Whitworth Academic Catalog 2016-2017)

As a course that focuses specifically on environmental science, the learning objectives of this class center on gaining an understanding of both the physical, social, and ethical/religious aspects of the environment. These learning objectives explicitly seek to accomplish Natural Science General Education and Biology department student learning outcomes. At the end of the class, students should have learned to:

1. Understand how to apply the scientific method, understand its strengths and weaknesses.
2. Understand historically how humans have approached the environment, including how Christians specifically have approached the environment.
3. Become familiar with biophysical and social aspects of environmental science issues.
4. Develop critical thinking and learning skills that allow you to integrate your understanding of environmental science with your personal and professional pursuits.
5. Gain a deeper understanding of specific environmental issues in the Pacific Northwest.

Expectations of the Student and Professor

As a student at Whitworth, you are challenged to think critically across disciplines. As such, I expect you to: 1) come prepared for class, 2) engage with course content, 3) think critically, and 4) be respectful toward other students. You can meet these expectations by doing course readings before class, engaging class material, integrating new knowledge into your thinking about the environment, and participating in class activities. I understand that “life happens” during a class, so if you have to miss lab, quiz, or test for any personal (e.g. death in the family) or religious reason, please talk to me directly as soon as possible so we can make arrangements to make up the work.

To hold up my end of the bargain, I seek to provide a learning environment where you feel safe and welcomed to critically engage with the class material and fellow students. To this end, I will keep my learning objectives well-defined, class material clear, and ensure the classroom environment is open and respectful. I will also to keep grading clear and fair, hold consistent office hours, and be available by appointment outside office hours for any additional feedback or help.

Textbook: None required.

Readings: Readings will be periodically assigned in class for thought papers.

Grading and Evaluation

Grades will consist of 1000 points. The point breakdown is as follows:

Category	Total Points	Grade Percent	Notes
In-class exercises (14)	240	24%	20 points each, each day of class (except last two days), lowest two scores dropped
Thought papers (6)	180	18%	30 points each
Comments on thought paper (6)	60	6%	10 points total for two responses
Assignments (2)	100	10%	40 points each
Project proposal	20	2%	due Jan 9 th
Project presentation	150	15%	Jan 25 th (last day of term)
Exam I	125	12.5%	Jan 13 th
Exam II	125	12.5%	Jan 24 th – 25 th (take home)

Grades will be calculated based on a percentage of the total points earned, as follows:

93 - 100	A
90 - 92	A-
87 - 89	B +
83 - 86	B
80 - 82	B-
77 - 79	C+
73 - 76	C
70 - 72	C-
60 - 69	D
< 59	F

In-class Exercises

Attendance will not be part of a student's grade, however there will be 14 in-class exercises. In these exercises students will be given the opportunity to work through problems, discuss environmental issues, and learn from their fellow students. Credit will be determined by the effort put forth (see rubric below). Your lowest two will be dropped. Credit can be made up with a one-page (double-spaced) reflection paper on the topic covered, but the student must initiate this first with the instructor. The in-class exercises will be graded as follows:

20 pts: Actively engages in exercise and peer discussion	16 pts: Engages in most of exercise, some interaction with peers	12 pts: Engages in part of exercise, limited interaction with peers	8 pts: Does almost none of exercise, little interaction w/ peers	4 pt: No interaction w/ peers and does none of the exercise
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Thought Papers

Thought papers are designed for you to reflect on the course content and interact with your peers. A total of six thought papers will be assigned and they will be worth 30 points each. Thought papers will consist of a short essay written in response to some question posed in class, often based on an assigned reading or movie. The papers should begin with a two to three sentence answer to the question, followed by your own opinion regarding the thought question. You should support your opinion with two or three reasons why you believe it to be true. There are no right or wrong opinions, the important thing is it made clear you have spent some time thinking about the topic. Thought papers should be typed and approximately 250 words long, and should represent your own ideas, so you should work independently rather than with other students. Your thought paper will be posted to blackboard (although save it as a word document on your own computer in case something goes wrong with your submission!) on a forum where all the other students can see your thought paper. The paper must be posted by midnight. The following day two responses to other peoples submitted thought papers will be due by noon – one response to someone's thought paper with whom you agree, and one response with whom you disagree. The response will be worth 10 points. Thought papers and subsequent responses will be the basis for in-class discussions, and therefore must be completed before class. **Late thought papers will receive zero points without prior permission from the instructor.**

Points for thought papers will be assigned as follows (30 points total):

Typed, correct length, spelling and grammar:	6 points
Your answer directly addresses the question and shows that you are familiar with the material:	8 points
Your opinion is directly pertinent to the question:	8 points
You support your opinion with 2-3 reasons that it might be true:	8 points

Responses to thought papers posted to Blackboard will be worth 10 points graded based on a thorough responses. Thorough responses will a) be at least three sentences, b) give specific reasons why you disagree/agree with the persons opinion based on evidence, and c) be civil in nature.

Assignments

This class will have two assignments. The purpose of assignments are to "try on" the scientific method of asking scientific questions, forming hypotheses, collecting data, and evaluating if your hypothesis was true or false. Assignments will be due on the dates specified below in the class schedule, unless specified otherwise by the instructor. **All assignments are due at the beginning**

of class on the due date specified for each assignment. Electronic submission of assignments is required. Electronic submissions must be submitted via Blackboard in Microsoft Word. Submissions in any other format will be returned without review, and any penalties for late work will be applied to the re-submission of the assignment as if it had not been submitted.

Project

The class project is centered on the process by which federal land makes decisions on how to manage the land. In the western U.S. approximately half the land is federal land and any land management action on this land must undergo the National Environmental Policy Act (NEPA) process. The NEPA process includes doing an Environmental Impact Statement (EIS) or Environmental Assessment (EA). Draft EISs and EAs are posted to the Federal Register where **any** citizen can leave public comments that are taken into consideration when the final land management decision is made. The project will involve each student choosing an EIS or EA they are interested in, researching background information on the project, forming their own opinion on their preferred land management option, leaving a public comment, and finally presenting an overview of the project and what their opinion is on the project. It is encouraged that each student chooses a project in their home state or in an area or ecosystem they care about. By Monday January 9th, each student must explore the federal register to choose an EIS or EA and give a brief justification for why they chose this project. The student will then spend time reading through the draft EIS/EA, researching the background, and forming an opinion on which land management option they prefer. They will present an overview of this information on the last day of class in a 5 – 7 minute presentation. You will be evaluated both by myself and your peers. Further details will be given for this project once your draft EIS/EA is chosen.

Exams

Exams may contain a combination of multiple choice, matching, short answer, and essay questions, and will cover all material since the previous exam. While this means that the exams are not strictly comprehensive, material from prior topics pertinent to current material may be included on the exam. **Exams must be taken at the allotted time unless you receive permission from the instructor at least one week prior to the exam date. Failure to make prior arrangements will result in a zero for the exam.**

Academic dishonesty:

Plagiarism will not be tolerated and will result in an F for the course. While collaboration between students on assignments and discussion during in-class exercises and thought papers is encouraged, you must do your own work. If you are unsure what constitutes plagiarism, please consult the Whitworth Academic Information page:
<http://catalog.whitworth.edu/academicinformation/>

Non-discrimination and Special Needs:

Whitworth University is committed to delivering a mission-driven educational program that cultivates in students the capacity to engage effectively across myriad dimensions of diversity. Whitworth University is committed to the fair and equal treatment of all students in its educational programs and activities. The University does not discriminate against students based

on race, color, national origin, sex, religion, age or disability and complies with all applicable federal or state non-discrimination laws in its instructional programs.

Reasonable accommodations will be provided for students who have a documented temporary or permanent disability. Please notify me of any disability the first week of class, and I will gladly provide accommodations as needed. All accommodations must be approved through the Educational Support Office (Andrew Pyrc – ext. 4534; apyrc@whitworth.edu). Students who have concerns about how they have been treated should contact Dr. Randy Michaelis, McEachran Hall 218, ext. 4402, rmichaelis@whitworth.edu.

Course Schedule

Date	Lectures/Subject	Tasks	Due (subject to change)
Jan 3	Unit I: Intro to Environmental Science 1.1: Class overview 1.2: Status of Environmental Science Issues 1.3: Unit Conversion and Graphs 1.4: Social-Biophysical Systems	In-class # 1	
Jan 4	1.5: Environmental Worldviews 1.6: Environmental Ethics 1.7: NEPA	In-class # 2	Online pre-class survey due (before class)
Jan 5	Unit II: How the Earth Functions 2.1: Air, Climate, and Weather 2.2: Rocks! 2.3: Water Cycle	In-class # 3	Thought paper #1 due at midnight
Jan 6	2.4: Soil Computer lab: exploring NEPA Field Trip: Snow measurements	In-class # 4	Thought paper responses #1 due before class Thought Paper #2 due at midnight
Jan 9	2.5: Nutrients 2.6: Biomes	In-class # 5	Thought paper responses #2 due before class project proposal due
Jan 10	2.7: Ecosystems and Organisms Field Trip: Back-40 Ecosystem	In-class # 6	Snow measurement assignment due
Jan 11	Unit III: People and the Environment 3.1: Population Growth 3.2: Energy I 3.3: Energy II	In-class # 7 Documentary: Damnation (evening)	Thought paper #3 due at midnight
Jan 12	3.4: Land Use: Water Case Study #1: Columbia River and Dams	In-class # 8	Thought paper responses #3 due before class
Jan 13	3.5: Land Use: Forests Case Study #2: Logging in the PNW	Exam I In-class # 9	Thought Paper #4 due at midnight Ecosystem assignment due
Jan 16	Martin Luther King Day – No Classes		

Jan 17	3.6: Land Use: Agriculture 3.7: Human Nutrition Case Study #3: Palouse and Farming	In-class # 10	Thought paper responses #4 due before class
Jan 18	3.8: Conservation Biology Case Study #4: Sage grouse conservation	In-class # 11	Thought Paper #5 due at midnight
Jan 19	3.9: Coastal and Marine Conservation Case Study #5: the Salish Sea	In-class # 12 Documentary: Food Inc. (evening)	Thought paper responses #5 due before class
Jan 20	3.10: Climate Change Case Study #5: Climate change in the PNW	In-class # 13	Thought Paper #6 due at midnight
Jan 23	3.11: Environmental Justice Case Study #6: Native American Land Issues	In-class # 14	Thought paper responses #6 due before class
Jan 24	3.12: Looking to the Future Catch-up/Project time		Exam II posted on Bb
Jan 25	Project Presentations		Exam II due before start of class