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Fall 9-1-2021

### ENSC 501.01: Scientific Approaches to Environmental Problems

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#### Recommended Citation

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## Scientific Approaches to Environmental Problems

ENSC 501

Fall 2021

Facilitator: Len Broberg  
103 Rankin Hall  
243-5209  
Ofc. Hours: Wed 1030-12 noon & 300-430 pm  
len.broberg@umontana.edu

### Purpose of the Class

The class is designed to introduce students without a science background to the approach, methodology, and concerns of scientists and scientific institutions. Conservation biology will be used as a substantive scientific focus for the class. Students will do a real world project involving the gathering and translation of scientific/technical information for use in environmental decision-making. Ultimately the purpose of the class is to equip students with enough familiarity with science to interpret basic scientific materials, gather scientific information and effectively incorporate scientific information in an environmental decision-making process.

### Required Texts:

- Moodle site for ENSC 501 has readings
- Pielke, Roger Jr. 2010. *The Climate Fix*. Basic Books, New York. (available as Nook E-book for \$11.99 or paperback for \$17.95 or used from \$6.08 plus shipping from Amazon as of 8-17-21)

### Tentative Schedule- Read the Moodle site material for the date except where otherwise indicated on the syllabus

- *August*
  - 31 Intro
- *September*
  - 2 Science and worldviews
  - 7 Hypothetico-Deductive Method
  - 9 Statistics- type I & II error
  - 14 Risk Assessment/Life Cycle Assessment
  - 16 Alternatives assessment - Precautionary Principle
  - 21 Exxon Valdez and BP Oil Spills- Questionable science- **Select Project**
  - 23 Mansfield Library- Barry Brown Science Librarian
  - 28 Response to Harde Carbon Cycle paper
  - 30 Models in conservation- **First Project Report due & action plan due**

- *October*
  - 5 Climate Change economics (Pielke Chap 3 and 4)
  - 7 Traditional Ecological Knowledge- Rosalyn LaPier Values in Science
  - 12 Values in Science
  - 14 Scientists as advocates- barriers & benefits - **Journal and Action Plan 2 due**
  - 19 Conservation biology and activists
  - 21 TBA
  - 26 Climate change science and politics (Pielke Chap 6-8)
  - 28 Climate change and biodiversity conservation
- *November*
  - 2 Science and policymaking
  - 4 Science and policymaking (continued) **Second Project Report Due**
  - 9 Science in the courtroom
  - 11 Veteran's Day Holiday-no class
  - 16 Climate policy- a way forward? (Pielke Chap 9)
  - 18 Montreal Protocol-Science in policy action
  - 23 Project Day
  - 25 Thanksgiving Holiday- no class
  - **30 Project Presentations 1**
- *December*
  - 2 Project Presentations 2
  - 7 Project Presentations 3
  - 9 Project Presentations 4 **Final Project Report Due**
  - 15 Project Presentations 5 10:10-12:10 in classroom

## Projects

Students will work individually on a project for an organization. A list of potential projects will be available on Moodle and posted on my door. You will be required to select a project by **September 21**. I am happy to discuss projects with students before selection. Oftentimes more than one student wants to sign up for a project (or on projects divided between several students-more than the project can support)- I encourage you to seek out your classmates and try and resolve the duplication to your mutual satisfaction. In the event that you cannot decide the issue, the instructor will be the final arbiter.

The projects are designed to be completed in a semester. Please do not contact the individual organizations about projects I post prior to the approval of your selection by the instructor, unless you gain instructor approval first. The groups are more than happy to hear from you, but we do not wish to burden them with multiple calls asking the same questions. Ask me first and we'll take it from there.

There are several steps to the project process. The timetable for these events is as follows:

### **Select project- September 21**

- In the first week following selection get in contact with the contact person and schedule a meeting (at least a phone conference) to get together with them and anyone else important to the project.

### **First Project Report- September 30**

- This report will do the following: 1) Identify the group with which you are working, 2) outline what the major scientific/technical issues are that you will be addressing, 3) identify why this work is important to the organization and the environment, 4) reveal what your concerns are about completing the project (what are your strong and weak points), 5) spell out initial operational plans for the project and 6) set forth a tentative timeline for the project.

### **Second Project Report- November 4**

- You will complete a report summarizing your work to date analyzing the scientific issues involved in your project. Ideally, this report will be a draft of at least a substantial part of your final report. If so, I will project a grade based on the content and writing of the report and provide comments to guide the remaining work on the report.

### **Final Report/Product- December 9**

- This will be the final work product you will produce for your client. You will

make a final presentation to the class on **November 5-17**

## Action plan/daily journal

In a daily journal format you will record the steps taken to complete your project. The journal will be a personal resource that tracks your work and a planning tool. Following project selection you will turn in an action plan that identifies the steps you will take in the next 3 weeks to complete the project so that the facilitator and/or teaching assistant can make suggestions. On October 23 you will turn in a journal that has your research to date, your ideas on further steps and directions and some preliminary conclusions for instructor review and comment.

- **Action plan/journal due dates:**
  - **September 30- action plan only**
  - **October 14- action plan and journal**

## Other exercises

1. There will be occasional reading reflections assigned. There will be one assignment that will require you to use the library or other sources to find scientific support for a response to an article. Other small assignments may be made during the semester.

## Office Hours

The facilitator has Zoom office hours that are available for drop-in consultation.

- Wed morning 1030-12 noon: <https://umontana.zoom.us/j/92196219592>
- Wed afternoon 200-330 pm: <https://umontana.zoom.us/j/92196219592>

Len is also available at other times by appointment. You may make appointments in class, by email or by telephone.

## Grading

The grade in the class will be based largely on the project and associated work (oral presentations, journal/action plan, and written reports/products). Plus/minus grading will be used. The breakdown is as follows:

- Project 65%
- Class participation 25%
- Other assignments 10%

**If I do not receive confirmation from your group that they have received your final product by the end of exam week YOU WILL RECEIVE AN INCOMPLETE!**

## Learning Objectives

By the end of the course students should:

1. Be able to explain and apply the scientific method to environmental problems.
2. Understand and communicate the strengths and limitations of science in resolving those issues.
3. Be able to locate and translate relevant scientific and/or technical material.
4. Be able to locate experts for consultation.
5. Have improved their oral and written communication and presentation skills.

## Disability modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and [Disability Services for Students](#). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or call 406.243.2243. I will work with you and Disability Services to provide an appropriate modification.

## Student Conduct Code

Plagiarism or other misconduct as defined in the [Student Conduct Code](#) will result in sanctions possibly including receiving a failing grade for the course and referral to a formal misconduct process

## Coping with Coronavirus

The following actions to protect ourselves and each other as best as possible are required when the course meets face-to-face:

- Mask use is required within the classroom
- Each student is provided with a cleaning kit. The expectation is that students will clean their personal work space when they arrive for class, and before they leave the classroom
- Classrooms may have one-way entrances / exits to minimize crowding
- Students should be discouraged from congregating outside the classroom before and after class
- Specific seating arrangements will be used to ensure social distancing and support contact tracing efforts
- Class attendance will be recorded to support contact tracing efforts
- Drinking liquids and eating food is discouraged within the classroom (which requires mask removal)
- Information on the nearest “refill” stations for cleaning supplies/hand sanitizer if applicable
- Stay home if you feel sick and/or if exhibiting COVID-19 symptoms

- If the student is sick or displaying symptoms, please contact the Curry Health Center at (406) 243-4330
- Up-to-Date COVID-19 Information from the University of Montana
- UM Coronavirus Website: <https://www.umt.edu/coronavirus>
- Remain vigilant outside the classroom in mitigating the spread of COVID-19