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ENSC 501.01: Scientific Approaches to Environmental Problems

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Scientific Approaches to Environmental Problems

ENSC 501

Fall 2016

Facilitator: Len Broberg
107A Rankin Hall
243-5209
Ofc. Hours: Monday 10:30-12:00 am, Thursday 12:30-2 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 Kindle E-book for \$12.99 or used through Amazon.com for \$0.73 and up as of 8-15-16)

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

<i>Aug. 30</i>	<i>Intro</i>
<i>Sept. 1</i>	<i>Science and worldviews</i>
<i>6</i>	<i>The hypothetico-deductive method</i>
<i>8</i>	<i>Statistics- type I & II error</i>
<i>13</i>	<i>Risk Assessment*</i>
<i>15</i>	<i>Alternatives assessment - Precautionary Principle* -Select Project</i>
<i>20</i>	<i>Science database research training- Barry Brown LA 206 Computer Lab</i>
<i>22</i>	<i>Public Health and Science-The Flint Water Crisis- Robin Saha- First Project Report due & action plan due (email to Len at address above)</i>
<i>27</i>	<i>Ethics, Science and Outcomes- Dr. Dan Spencer</i>

- 29 *Flathead Lake: Science in Freshwater Systems- Tom Bansak*
- Oct 4 *Response to Svensmark*
- Oct 6 *Models and Policy--*
- 11 *Climate Change economics* (Pielke Chap 3 and 4)*
- 13 *Clint Muhlfeld- Trout and climate change*
- 18 *Values in science* **Action plan/journal due***
- 20 *Scientists as advocates- barriers & benefits**
- 25 *Corporate science and government- The BP Oil Spill and Exxon Valdez*
- 27 *Climate change science and politics* (Pielke Chap 6-8)*
- Nov 1 *Regional climate assessment **Second Project Report Due***
- 3 *Climate policy- a way forward? (Pielke Chap 9)*
- 8 *Election Day- No class*
- 10 *Science and policymaking**
- 15 *Science and policymaking (continued)*
- 17 *Science in the courtroom*
- Nov. 22-Dec. 8 & Final exam date-day, Tuesday December 20, 10:10 am -12:10
- Final presentations**
- 24 *Thanksgiving Holiday*
- Dec. 8 *Final Project Report Due***

Projects

Students will work individually on a project for an organization. A list of potential projects will be distributed in class and posted on my door. You will be required to select a project by **September 15th**. 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. Some projects, however, may require field work to some degree and others may require the acquisition of some biological skills in the field. These projects are excellent learning experiences, but make sure you allow adequate time in your schedule to handle the travel time and inevitable trial and error in the field so that you do

not overload yourself.

Please do not contact the individual organizations about the project 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 15

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 22

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) initial operational plans for the project and 6) set forth a tentative timeline for the project.

Second Project Report- November 1

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 portion 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 6

This will be the final work product you will produce for your client. You will make a final presentation to the class on November 22 or 29; **December 1, 6 or 8th; or the final exam date 12/20 10:10 am- 12:10pm.**

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 22- action plan only

October 18- action plan and journal

Other exercises

1. Students will turn in an assignment as follows based on the reading for class for each day with an asterisk in the syllabus: Quote one passage or idea from one of the readings and explain why you selected it and how it influences your thinking on the topic. Please submit this assignment as an e-mail or an attachment to an e-mail to the instructor at len.broberg@umontana.edu by the

start of the class (9:40 am). Late submissions will not receive credit unless previously approved by the instructor.

2. From time to time we will ask you to write your thoughts on issues relevant to the reading for class. These assignments need not be typed but should be legible. In the course of these assignments, we ask you to take a position or analyze a problem

3. 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.

Office Hours

The facilitator has set office hours that are available for drop-in consultation. 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 70%
- Class participation 20%
- 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.