Issues in Water Quality

"Water is the most critical resource issue of our lifetime and our children's lifetime. The health of our waters is the principal measure of how we live on the land."
~ Luna Leopold

100 Riley-Robb Hall
Tuesdays & Thursdays 10:10-11:25 (3 credits)
with optional 1 credit lab (Thursday 2:30-4:25)

Instructor: Lauren McPhillips
B62 Riley-Robb Hall
607-555-5555
lem36@cornell.edu

Office Hours: Mon/ Wed 9-10 am
or by appointment

Teaching Assistant: Willy Waters
wcw999@cornell.edu

As humans, we depend on the availability of good, clean water to stay healthy. The same goes for most other living creatures around us. Taking this course will allow you to understand what really makes 'good, clean water' as well as how issues in water quality can arise, and what we might do to deal with or fix these issues. I think it's important for every person to have some understanding of the potential stresses or threats to these water resources that we so strongly depend on. No matter what, this class will make you a more informed citizen. I also hope that some of you will feel inspired to pursue an education in environmental science or engineering and more directly work to protect these valuable resources.

I. Rationale:

This is an introductory course intended primarily for freshmen or sophomores. There are no specific course prerequisites, other than an open mind and interest in learning about water quality issues! For planning your degree here at Cornell, this course satisfies the CALS Physical & Life Sciences Discipline distribution requirement as well as distribution options for the Environmental Science and Sustainability major.

II. Course Aims and Objectives:

Aims

After taking this course, you'll have a concrete understanding of what 'water quality' really is, what can cause problems in water quality, and how we can practically try to solve these problems.

Specific Learning Objectives:

You will be able to:

=Explain the factors in water that determine its 'quality'
= List official standards by which water quality is determined
= Measure the quality of a particular sample using a variety of techniques
= Give examples of how humans can detrimentally affect water quality
= Explain physical & chemical mechanisms behind changes in water quality
= Propose means of mitigating adverse impacts on water quality
= Conduct and present a project that will utilize the above skills to explore a particular water quality issue

III. Format and Expectations:

The main component of this course is the twice-weekly lecture period. I'll spend some of the time going over new material and concepts that parallel the readings that I'd like you to do outside of class. We'll also spend some time having discussions, especially as we dig deep into specific case studies of water quality issues in the latter part of the semester. You are expected to come to class, and participation (as well as understanding of concepts) will be evaluated by use of I>Clickers. Copies of lecture slides will be posted in advance on the course Blackboard website, for those of you who like to use these for note-taking, or for those who miss class altogether. Outside of lecture, I ask you to do readings and provide short responses for homework, and we'll also have 2 exams and a major class project, all of which is detailed below.

Just as I expect you to come to class regularly and put effort into learning the course material, I will do my best to put together an exciting and informative lecture each day, and get you excited about water quality issues! Mid-way through the semester, you'll receive evaluation forms by email and I hope that you'll take that chance to let me know what you like about the class or what you think could be improved. If you have any specific trouble with class material, please don't hesitate to come to office hours or contact the course TA for extra help. We're in this together!

IV. Course Requirements:

1. Class attendance and participation policy:

   I understand that you may need to miss a lecture here or there, but generally expect you to attend class so that you don't miss important material and can participate in class discussions. Participation will be checked based on use of I>Clickers and factored into your grade, such that more than 3 absences will start to detrimentally affect your participation grade. See the CIT website for information on how to purchase and register your I>Clicker (http://www.it.cornell.edu/services/polling/howto-students.cfm#get).

2. Course readings & reading responses:

   (a) Textbook: none

   (b) Readings and other multimedia for case studies will be available on the course Blackboard website

   The readings and videos associated with lectures are an integral part of the class. For many of these readings, I ask that you provide a brief (5-10 sentence) response on the Blackboard Discussion Board, and I will have some questions on the Discussion Board to guide you. The duedates for these responses is noted on Blackboard. These short responses are important for checking that you understand all of the concepts that we discuss through the course of the class, from how to measure water quality to how to fix issues in water quality.

3. Exams.

   There will be 2 mid-semester exams: 7:30 – 9:00pm on October 10 and November 15.
   Both are open book, and will be a mix of multiple choice and short answer questions.
   Email me at least 2 weeks prior if there is a time conflict. Example questions will be posted on Blackboard.
   While no one loves to take exams, they're important for checking that you've learned the basic principles that are necessary to analyze more complex water quality issues, such as those that we'll explore in the case studies and in your projects.

4. Final project.

   In lieu of a final exam, there will be a final project culminating in a class poster session. For this assignment, you'll focus on a water quality topic of interest, as the case studies from class have. You'll have the option of collaborating with a partner for this project. Specific details for this project will be provided on a separate

document and discussed in class. In general, the project will allow you to synthesize all the knowledge gained from our discussion of the basic components of water quality as well as the specific issues addressed in the case studies. It will also allow you to explore means of mitigating water quality issues, as you'll be asked to propose potential means of dealing with whatever water quality issue that you choose. Additionally, in creating and presenting a poster, you'll gain experience in communicating your findings to others in a meaningful and effective way, something that will be useful in lots of future endeavors. For those of you that have not done large research projects before, there will be 2 early 'checkpoints' for the project (a written proposal, and a summary of 5 reference sources) to help you stay on track.

5. OPTIONAL- Laboratory section (1 credit)

For students interested digging a bit more deeply into water quality issues, there is a laboratory section that can be taken along with this lecture class. This lab provides some basic hands-on field and laboratory experience in taking and analyzing water samples. More information is provided in a separate syllabus on the Blackboard site.

V. Grading *(see section IV above for assignment details)*:

(a) Participation (20 %)

Total Points =the smaller of

0.20 or 0.20*(your participation days)/(totally possible participation days – 3)

Note: this allows for 3 days of missed class without penalty

(b) Reading responses (25 % total)

20 reading responses over the semester

Responses must be uploaded onto Blackboard Discussion Board by 10am on the duedate listed on Blackboard.

Individual responses are graded such that:

30%- good grammar and spelling

30%- cohesive, well-thought out ideas

40%- demonstrate appropriate summary of readings

(c) Exams (30 %)

2 exams, 7:30 – 9:00pm on October 10 and November 15

Worth 15% each

(d) Final project (25 %)

Initial project proposal: 5%

Due Oct 1

Summary of 5 references: 5%

Due Oct 30

Final submission & presentation: 15%

Poster must be submitted electronically by 10am last day of class (Dec 4)

Poster presentations will occur during the last day of class.

All project materials should be posted to Blackboard by the duedate above. A rubric used for grading the project components is also available on Blackboard.

Policy for late assignments: 25% reduction in points per day late

VI. Academic Integrity

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the student's own work. For this course, collaboration is allowed for the final project, but the individual contributions to the final work must be noted.

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During exams, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

VII. Accommodations for students with disabilities

In compliance with the Cornell University policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances, so arrangements can be made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.

VIII. Tentative Course Schedule

See Blackboard for readings associated with each day.

Week 1- Class begins on Thursday. Basic overview of syllabus & introduction

Week 2- Overview of hydrologic cycle, water sources (ground vs surface water)

Week 3- The components of 'water quality'

Week 4- Water quality standards & regulations.

Week 5- Measuring water quality

Week 6- Mechanisms of pollutant transport

Week 7- Fall Break (no class Tuesday). Basic mitigation strategies.

Week 8- Case study #1: Mining (sediment & metals)

Week 9- Case study #2: Natural gas drilling (stray gas)

Week 10- Case study #3: Mississippi basin (excess nutrients & pesticides)

Week 11- Case study #4: Bangladesh (arsenic)

Week 12- Case study #5: Baltimore, Maryland (fecal coliform)

Week 13- TBD topic Tues ;Thanksgiving (no class Thursday)

Week 14- Future threats & policy impacts

Week 15- Wrap-up and poster session

IX. Additional Resources

Check out the course Blackboard website for further links and resources on water quality issues.