

## ESP 360: Water Quality Assessment and Control

**Instructor:** Dr. Merrie Cartwright; 105D Bailey Hall, Phone: 780-5395,  
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**Office Hours:** M 1:00-2:00 & W 1:00-4:00, or by appointment

**Lecture:** MW 11:00-12:15, 319 Bailey Hall

**Lab:** M 2:00-5:00, 213 Bailey

**Text:** Laws, E.A. 2000. Aquatic Pollution: An Introductory Text. 3rd Edition. John Wiley & Sons, Inc. New York, NY.

*Supplemental Readings will also be assigned periodically throughout the course.*

**Course Description:** Water is an essential compound for life on Earth, and water quality directly affects the health of living organisms, including ourselves. Water quality and quantity issues are often interrelated. This class will address those relationships, as well as the chemical methods and biological criteria used to assess water quality, the legislation mandating quality standards, and the technologies pertaining to water quality control. We will especially focus on water quality problems within our region (e.g., paper/pulp mill effluents, combined sewer overflows, fishery impacts).

Water can often be a hotly contested resource locally, regionally and internationally. As global warming scenarios begin to take hold in reality, issues of water quantity and quality will continue to be of primary concern. It is therefore important to gain an understanding of the direct and indirect effects that changes in water quality and quantity can impose on ecological systems and human uses alike (e.g., industrial, agricultural, and domestic). This course will help to provide some of that perspective, in addition to teaching applied water quality monitoring techniques.

Week	Lecture Topics - <i>subject to change</i>	Reading
1/17	Course overview; aquatic ecosystems intro	Ch 1
1/24	Aquatic ecosystems – structure and function; nutrients intro	Ch. 2
1/31	Issues of quality and quantity – nutrients and trophic status	Ch. 3
2/7	Clean Water Act	handouts
2/14	Clean Water Act, cont.	handouts
2/21	<i>Winter Break – no class</i>	
2/28	Non-point sources; review for exam	Ch. 5
3/7	<b>Exam 1;</b> wastewater treatment; combined sewer overflows	Ch. 6
3/14	Paper/pulp mill effluents	Ch. 9
3/21	Pesticides	Ch. 10
3/28	<i>Spring Break – no class</i>	
4/4	Metal Pollution: mercury, cadmium, and lead	Ch. 12
4/11	Toxicology	Ch. 8
4/18	<b>Exam 2;</b> pathogens	Ch. 7
4/25	Biomonitoring	handouts

<b>Week</b>	<b>Lecture Topics - <i>subject to change</i></b>	<b>Reading</b>
5/2	Lake vs. river assessments; BMPs; watershed approach	handouts
5/9	<b>Final Exam: 5/10/05, 10:45-12:45</b>	

<b>Week</b>	<b>Laboratory Topics - <i>subject to change</i></b>
1/24	Water testing methods, QA/QC, accuracy/precision
1/31	Nutrient analyses; nitrate, ammonia, phosphorous
2/7	Chlorophyll, phytoplankton and periphyton
2/14	Tap testing; chlorine, hardness, turbidity, alkalinity
2/21	<i>Winter Break – no class</i>
2/28	Sediment testing; B.O.D., TSS
3/7	Bacteria analysis; <i>E. coli</i> membrane filtration technique
3/14	pH, sulfate, aluminum
3/21	Acid toxicity
3/28	<i>Spring Break – no class</i>
4/4	Generating concentration-response curves
4/11	Artificial substrates – rock baskets, Hester-Dendy plates
4/18	Macroinvertebrates (sampler retrieval)
4/25	<b>Term papers due; presentations</b>
5/2	Course review

**Lab & Fieldwork:** In this course, we will be collecting field samples for analyses and thus will spend a good deal of time in the field, regardless of weather. Appropriate clothing must be worn at all times! Winter sampling can be hazardous if clothing gets wet, so wear impermeable gear on feet and during precipitation events; spare socks and gloves are recommended. Long pants are required even in warm weather, and always bring a hat! When in the lab, use care with chemicals. Protective eyewear is required. Everyone will be briefed on lab safety measures; always *ask* if you have any questions about a laboratory procedure.

**Plagiarism:** Plagiarism is not acceptable and will not be tolerated. If you have any questions regarding proper source referencing for data or other information, please ask Dr. Cartwright. If you are caught plagiarizing information you will receive an automatic F for the course.

**Grading:**

In-class exams (2 @ 25% each)	50%
Final exam	15%
Term paper & presentation	10%
Lab exercises, assignments, quizzes	25%

All grades will be posted on Blackboard, along with any announcements or supplemental material. The Blackboard site for this class may be found at <http://www.courses.maine.edu>.

This course will not have plus or minus grading. The two in-class exams will be non-cumulative; the final exam will be cumulative. "Pop" quizzes may be given at any time.

The term paper will be an in-depth analysis of a particular water pollutant, including investigation of its sources, fates, transformations, environmental effects, analytical detection methods, control technologies, prevention methods, and water quality standards (state and federal). Papers should not exceed 10 typed (double-spaced) pages and must include properly formatted literature citations, with a minimum of 5 primary journal articles. Oral presentations of papers will be evaluated for accuracy, clarity, and cohesion.

***All assignments are due by 11:00 on the assigned due date. One letter grade per day will be deducted for each day an assignment is late.***

**Attendance:** Absences will be excused for legitimate reasons if you either notify the instructor in advance or produce documentation (e.g., of illness). At the instructor's discretion, up to ¼ of a letter grade will be deducted from your overall course grade for every unexcused absence. Make-up quizzes or exams will **not** be provided unless dire emergencies/conflicts are proven.

**ADA:** Support for Students with Disabilities – Students who may need assistance due to a disability are encouraged to contact the Office of Support for Students with Disabilities, Luther Bonney 242. Phone: 780-4706, TTY: 780-4395.