Fall, 2003
TR 10:55 - 12:10, 222 Health Center
214 Health Center (office)
222 Health Center (ENVH office)

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ENVH 402 - PRINCIPLES OF WATER QUALITY

Course content coverage: The physical, chemical and biological properties of water with respect to fundamentals of water quality measurement and control.

Desired student outcomes: Ability to function in a water quality specialist capacity as an environmental professional. Ability to generate and use water quality data in evaluating and managing systems. Familiarity with approaches used in water quality management, and ability to use standard techniques. Enhanced communications, quantitative and problem solving skills.

Schedule

Aug 26	Introduction	
Aug 28	Watersheds	EPA, Chapter 1
Sept 2	Basic Chemical Concepts	Snoeyink & Jenkins; p. 1-23
Sept 4	Basic Chemical Concepts	
Sept 9	Basic Chemical Concepts	
Sept 11	Basic Chemical Concepts	Laws, Chapter 1
Sept 16	Physical Factors of Water	Laws, Chapter 3 & pp. 16-20
Sept 18	Physical Factors of Water	
Sept 19	Field trip - IJC meeting (all day)	
Sept 23	Nonpoint Source Pollution	Laws, Chapter 5
Sept 25	Oxygen Demand	
Sept 30	Oxygen in Water / Solids in Water	
Oct 2	Solids in water	
Oct 7	Midterm 1	
Oct 9	FALL BREAK	
Oct 14	Report 1 Due / Midterm Review	
Oct 16	Nutrients in Water	Laws, pp. 20 - 32
Oct 21	Eutrophication	Laws, Chapter 4
Oct 23	Pathogens	Laws, pp. 172 - 191.
Oct 28	Sewage Treatment	Laws, Chapter 6
Oct 30	Sewage Treatment	

Nov 4	Drinking Water Treatment	Laws, pp. 191-195
Nov 6	Drinking Water Treatment	
Nov 11	Alternative and Advanced Water Treatment	
Nov 13	Pesticides	Laws, Chapter 10
Nov 18	Heavy Metals / Report 2 Due	Laws, Chapter 12
Nov 20	Midterm 2	
Nov 25	NO CLASS (to compensate for 9/19)	
Nov 27	THANKSGIVING HOLIDAY	
Dec 2	Midterm Review / Groundwater	Laws, Chapter 16
Dec 4	NO CLASS (to compensate for 9/19)	
Dec 9	Sources of Water and Wastewater Quality Data	internet assignment
Dec 11	Water and Wastewater Quality of Selected Resources	
Dec 16	Final Examination (10:45 – 12:45)	

Student Responsibilities:

Much of your assigned reading is from *Aquatic Pollution, An Introductory Text* by Edward A. Laws. It is available at the campus bookstore (and I've found in through internet resources at a bit cheaper cost). To be distributed in class is a small reading from Snoeyink, V.L, and D. Jenkins,1980. *Water Chemistry*.

Additional reading is from the U.S. EPA's *National Water Quality Inventory, 2000 Report*. It is available at: http://www.epa.gov/305b/2000report/chp1.pdf. This document provides information about the condition of water throughout the United States. Expect other reading to be assigned during class.

Reading should be done before the assigned class session. This will allow us to discuss the material, rather than being limited to lecture. In the event that the course gets off the syllabus schedule (which it usually does, as things come up during the course of the semester), and you are unsure of the topic for the day, be sure to contact the instructor **before** the course session to be able to complete the proper reading assignment.

Unannounced quizzes may be given based on the assigned reading. Ordinarily, quizzes will be given at the **beginning** of the class period. Students arriving in class **after** the quiz is distributed will **not** have an opportunity to make-up these quizzes.

Homework will be assigned regularly. Collaborative effects are encouraged; however, you should keep in mind that problems are assigned in order to learn the material and that taking results from other students could lead to disastrous results on the examinations. Completing the homework by the assigned date is critical to worthwhile classroom discussions. Grading will be done largely on the basis of having made a good effort (which may require a meaningful time investment) rather than a correct answer. It is critical that all work be shown on homework problems, and that work be done legibly. Problems should be done in ***pencil***, with ***red*** ink used in class as each problem is discussed. Late homework will ordinarily not be accepted.

We are fortunate in having the International Joint Commission hold its annual meeting this year in Ann Arbor, Michigan on September 9. Please see http://ijc.org/ijcweb-e.htm for additional information. We will be attending this all day meeting, leaving BG at 6:00 A.M.! (yawn). Please plan ahead so that you can go. You are required to write a summary and critique of two speakers= presentations, one from the morning and one from the afternoon. For each, identify the session and speaker, summarize what was said, and provide your evaluation of the scientific validity and contribution of the information. These papers should be 2-3 pages in length, double spaced.

You are required to write reviews for two research articles. These reviews, approximately two (and no longer than three) pages in length (double spaced), will consist of summarizing and critiquing an article from the journal "Journal of the American Water Works Association," and an article from the journal "Water Environment Research." These journals are the key journals in the water supply and wastewater control industries. A summary sheet will be distributed giving you further guidance on these reviews. In addition to the written review, a 5-minute class presentation is required on the reviews. The reviews are due October 14 and November 18.

Exams will consist of two 75-minute midterms and a two-hour comprehensive final.

One paper is required addressing the following specific local situation. A new dairy for raising 671 dairy cows and producing milk has been developed just outside of Bowling Green (about 9 miles away on the southwest side of town). Many local residents are extremely concerned that this farm will damage public and ecosystem health. Please prepare a paper titled AProjected Impacts of a Dairy Farm on Water Resources near the City of Bowling Green.@ In this paper identify the **nature** and **magnitude** of any projected impacts (please do not assume that there will be impacts - you have to come to your own conclusions and base your conclusion on facts available from reliable references.) A key to the success of your paper is providing a reference to every fact that is presented. The formatting for providing these citations **must** follow the author date system used in the *Journal of the American Water Works Association*.

In writing your paper, please follow the format and outline shown below, using the titles and section headings as indicated. You may add additional subheadings for your paper.

Projected Impacts of a Dairy Farm on Water Resources near the City of Bowling Green

by

(Your name here)

December 2003

Introduction

(This section should contain a description of what the paper is about)

Background

Water Resources in Bowling Green

(This section should contain a description of the water resources around BG that could be affected by this new dairy farm.)

Potential Impacts from Factory Dairy Farms

(This section should contain a description of the specific types and amounts of pollutants that may come from dairy farms of this size, and their potential impact on the aquatic environment.)

Water Quality Regulations Affecting Factory Dairy Farms

(This section should detail the legal requirements with respect to water quality of operating a dairy farm of this size).

Projected Impact on Bowling Green Region

(This section should have a detailed description of the nature and magnitude of impacts expected in this region. This section should provide a synthesis of the information presented in the background section of the paper)

Recommendations and Conclusions

(In this section, specify exactly what you think should be done in response to this proposed project. (Please do not assume that action needs to be taken - part of your job is to justify any action.)

References:

(In this section, include all of the references that you cited in your paper. They **must** be cited using the formatting used in the *Journal of the American Water Works Association*. See any issue of the *Journal* for examples, or see me if you have questions.

The paper is due on December 9 by 5:00. Five points will be deducted from the paper score (100 points are possible) for every day the paper is handed in late. **Please work independently on this paper!**

FINAL COURSE GRADE CRITERIA

Midterms (2@20%)	40 percent	Final	25 percent
Homework & Quizzes	10 percent	Article Reviews	5 percent
Dairy Farm Paper	15 percent	Ann Arbor Field Trip	5 percent

Studying Environmental Health at BGSU

This course fulfills one of the requirements for majors in environmental health at BGSU. It also is intended for other students interested in environmental issues from a variety of majors.

Our Environmental Health Program is one of only 24 in the United States recognized by the National Environmental Health Science and Protection Accreditation Council. Our learning outcomes for students are to:

1. think critically and creatively.
2. demonstrate knowledge and abilities useful in the professional workforce.
3. function as a member of an environmental health team in the public or private sector.
4. learn independently over a lifetime
5. fully participate in the art and science of identifying, evaluating and managing environmental factors that can adversely impact the health of humans and their environment.

If you're interested in learning more about majoring on minoring in the Program, just ask any of the program faculty.