Chemistry 103: Introduction to Environmental Chemistry **Syllabus**
Dr. Jonathan Gutow **Spring 2012**

Course Objectives

The overall objective of this course is to help you become scientifically literate. As citizens of a democracy we are often called upon to make decisions that involve scientific issues. Our modern technological society is the result of scientific research and its application. Since we are so dependent upon the scientific enterprise, it is a wise policy to be aware of how it works, what it can and cannot do, how it impinges upon our lives, and when you have to defer to an expert opinion. In this course the emphasis is on how the scientific discipline of chemistry can help us understand contemporary environmental issues, and what it tells us about possible solutions to environmental problems the world is facing.

Instructor	Office	Phone	E-mail	Web Site
Dr. Jonathan Gutow	HS - 412	424-1326	gutow@uwosh.edu	http://www.uwosh.edu/facstaff/gutow
Office Hours	MWF 11 - 12, T 4:30 - 5:15, Th 9 - 10, or by appointment.			

Course Overview

Lectures: 9:10-10:10 MWF (HS-268). Each class will be devoted to several concepts, with the material corresponding to the textbook chapters listed in the schedule (see below). Bring your calculator so that you will be able to do practice exercises. Skimming the chapter before it is discussed in class will make it easier to take notes.

Quizzes and Exams: There will be some in-class quizzes and four 60 minute exams. Although the exams are not cumulative you will need to know material from the earlier chapters to understand things covered on the later exams.

Worksheets: In class exercises that will be scored on an all or nothing basis (honestly attempted versus not attempted).

Labs: Meet in HS-401 on Tuesdays (Sec 1: 8 -10:10, Sec 2: 10:20 - 12:30). Laboratory experiments are chosen to illustrate concepts being discussed in lecture and to be FUN. To prepare for lab you should read the experiment before attending lab. Don't forget to bring your lab book, pen, goggles and calculator.

Web Project: A three (3) paragraph essay comparing a pair of web sites due no later than April 27, 2012.

Homework: You should do the homework since it will prepare you for the tests and quizzes. Homework is not graded. Answer keys will be provided to allow you to study for the quizzes and exams.

Reading/Studying: Devotion of time each day to chemistry homework is the most efficient way to study for the class. College students are very busy; try this method to save time! Skim the text before the first lecture on the material. Look at the introduction, the subtitles for sections, the pictures and their captions, and the chapter summary listed at the end. After each lecture review your notes, read the appropriate textbook sections and try the related homework problems.

Required Materials

Text: *Chemistry in Context: Applying Chemistry to Society,* 7th Edition. Please try to read each chapter before we begin discussing it in class. This will familiarize you with the vocabulary and concepts being discussed so that you can take notes more efficiently.

Lab Manual: *Chemistry in Context Lab Manual,* 7th Edition.

Other**:** Safety goggles (available from the bookstore or the Chemistry Club) and a calculator capable of handling scientific notation, square roots, powers and logs. **Pen for use in lab. No pencil may be used in lab.**

E-mail discussion list: All registered students will be added to the class e-mail discussion list. The instructor will use this list to send out notifications and reminders when problem sets and answer keys are posted. **Participating in this list is one of the ways to receive extra credit (**see below).

Grading

Exams:	4 @ 100 points each	400 (57.1 %)
Quizzes:	4 @ 10 points each (worst score replaced with average of others)	40 (5.7 %)
Worksheets	In class exercises	55 (7.9 %)
Laboratory:	6 points for doing each experiment 9 points for data sheets and answers to assigned questions	165 (23.6 %)
Web Project	40 points	40 (5.7 %)
Total:		700 (100.0 %)

The minimum points necessary for each grade range is listed below. These cutoffs will not be adjusted upward, but the instructor reserves the right to lower them.

Grade Range	A/A-	B+/B/B-	C+/C/C-	D+/D
Score at least	605	520	435	350

Extra Credit:

E-mail discussion: Two (2) points of extra credit, towards a maximum of 28 points extra credit, will be given for each question related to the course or answer to a question which is submitted to the class e-mail discussion list. Administrative questions and things such as invitations to meet for study groups will be posted to the list, but will not count for extra credit. *You must send list submissions from your campus e-mail account, as the list server does not recognize other addresses as valid. The E-mail address of the list is gutowchemclass@lists.uwosh.edu.*

Celebration of Scholarship. Up to eight (8) points of extra credit will be available for attending the poster session or talks and turning in a one-half to one page essay describing what you learned from one related to biology, chemistry, environmental science or geology. The essay will be graded for clarity and grammar. Celebration of Scholarship runs most of the day on Thursday, April 19, 2012. Talks will be scheduled in the morning and most poster authors will be available to talk to between 11 AM and 1 PM. This essay must be turned in to the D2L drop box by 5 PM MONDAY, April 30, 2012.

Course Policies

Absences: The reason for any excused absences must be reported to your instructor (before the absence, if possible). Assignments and tests missed because of an excused absence will not count against your record, but you will be held responsible for material covered during your absence.

Grading Errors: To be considered for possible regrading any mistakes must be brought to the attention of your instructor within one week of the time the exam, quiz or project is returned to you.

Final Grade Check: You are responsible for checking that your final score is correct. Save all papers, exams and quizzes until the final course grade has been determined.

Academic Dishonesty: Cheating (not doing the work yourself) on exams and quizzes will not be tolerated. Plagiarism will not be tolerated. By turning in a written assignment you are certifying that the assignment represents your own work.

Exams/Quizzes

Quizzes: There will be 10 minute quizzes at the end of class as noted in the schedule later in this syllabus. The quizzes will be on the chapter that is being discussed. Your worst quiz score will be replaced with the average of your other quizzes. Do not skip quizzes early in the semester in case you get sick later and miss a quiz.

Exams: There will be four 60 minute exams in class as noted in the schedule. Although the exams are not cumulative you will need to know material from the earlier chapters to understand things covered later.

Laboratory

The labs are worth 6 points for showing up and doing the work plus 9 points for completing the data sheets and assigned questions. Data sheets are due at the end of the laboratory period (make photocopies if you need them). If the questions cannot be answered during the laboratory period, they must be handed in by the lecture following completion of the lab. Up to six (6) points may also be deducted from any week's laboratory score for not wearing safety goggles, wearing inappropriate attire, unsafe behavior or not attending lab (-6 pts). **Two unexcused absences from lab will result in a failing grade for the course**. To have an absence excused you must bring a written excuse to your instructor. There will be no make up labs, unless you can make it to another laboratory section the same week.

Web Project

Choose a single issue from the list below and go to the class web site to find a pair of assigned web sites associated with the topic. Write a short essay about the issue consisting of three paragraphs: 1) summarizing the point of view of one web site; 2) summarizing the point of view of the other web site; 3) explaining which site you agree with and why. The third paragraph should include a critical analysis of the quality of the information in the web sites. You need to answer the question, "Is the content of the web sites verified or verifiable factual information or just hearsay?" You must back up your answer to this question with references and an analysis of the quality of the information source or sources.

The submission will be scored out of 40 points: each complete summary paragraph-8, a well reasoned point of view paragraph-10, grammar/spelling-8, meeting or beating intermediate deadlines-6.

Choose from one of these issues
Air Pollution, Climate Change, Energy Conservation, Alternative Energy Sources.

When completed upload your double-spaced essay to the Dropbox provided in the Chem 103 D2L site (http://www.uwosh.edu/d2l/). PDF documents are preferred but MSWord format is also acceptable. The essay is due no later than Friday, April 27, 2012 before 5 PM.

Hints and Words of Advice

Reading/Studying Suggestions: Devotion of time each day to chemistry homework is the most efficient way to study for the class. College students are very busy; try this method to save time! Reading assignments will be included on the homework sheet distributed for each chapter. Skim the text before the first lecture on the material. Look at the introduction, the subtitles for sections, the pictures and their captions, and the chapter summary listed at the end. After each lecture review your notes and read the appropriate textbook sections. Work through the in-chapter examples and exercises as you go along. If anything is confusing ask the professor about it. Try the questions at the end of the chapter and see which ones you know how to do. A suggested minimum list of which to try will be provided as "Homework". You can check your work since answers are in the back of the book for many of the problems and answers will be provided for all assigned problems. Mark any that you have trouble with so you can do more examples of that type of problem.

Homework: You should do the homework since it will prepare you for the tests and quizzes. Homework is not graded. Answer keys will be provided to allow you to study for the quizzes and exams. Answers to some of the in-text exercises may be found in appendix 5. Complete answer keys will be available a few days after the problems are assigned. Answer keys will be posted on the Chemistry 103 web site (http://www.uwosh.edu/facstaff/gutow/environmental-chemistry-chem-103).

Resources

Chem 103 Web site: (http://www.uwosh.edu/facstaff/gutow/environmental-chemistry-chem-103) Contains lots of useful information: copies of this syllabus, help with the web project, links to interesting and useful sites related to this course, information on tutors, homework assignments and answer keys. This site is constantly being revised so your suggestions of things to include would be appreciated. Most of the site is publicly accessible, however if you try to access homework information and answer keys you will need to log in using your campus e-mail username and password.

E-mail Discussion Group: You have been signed up for this list by registering for the class. This is a moderated discussion. All submissions will be seen by your instructor (primarily so that extra-credit can be given) before they are posted. Questions of general interest will be posted (without the name of the person submitting it). You are encouraged to send in your answers to questions. The instructor will attempt to answer any questions that are not answered by your fellow students within 48 hours. You should check your e-mail daily to get the maximum benefit from this discussion group. The instructor will also send announcements and reminders to this discussion group. *The E-mail address of the list is gutowchemclass@lists.uwosh.edu.*

Chapter Summary : at the end of each chapter lists specific issues, concepts and skills that you should learn.

The Chemistry in Context online learning center: also provides useful web links and study resources. Its web address is "http://highered.mcgraw-hill.com/sites/0073375667/student_view0/index.html".

University Center for Academic Resources: can help you find a tutors for your classes. More information available on their web site http://www.uwosh.edu/car.

Tentative Class Schedule:

Week Starting		Topics	Text Sections & Readings	Reminders, Web Project & Labs
1/30	M	Introduction, Green (Sustainable) Chemistry	0.1 - 0.7	• Start deciding on web project topic.
	W	Air, Units, Scientific Notation, Pollutants, Risk	1.1 - 1.3, Append. 1 & 2	• Lab: Check-in, Units, Conversions and Significance, (Bring Text Book)
	F	Air Quality, Troposphere, Classifying Matter, Molecules	1.4 - 1.8	• Take Class Choice Survey.
2/6	M	Reactions, Primary Pollutants	1.9 - 1.11	• Lab: Exp #1 & #3 (Lab Manual) – Gases in Breath, Graphing.
	W	Ozone, Indoor Air, Sig. Figs.	1.10 - 1.14	
	F	Ozone, Atomic Structure, Lewis Structures, Light **Quiz 1**	2.1 - 2.4	• "Class Choice" Online Survey Completed by **FRIDAY**.
2/13	M	Photons, Ozone, UV, Ozone Destruction	2.5 - 2.8	•Web project topic chosen and instructor e-mail querying choice answered by **FRIDAY**.
	W	CFCs et al, Ozone Hole, Politics of Pollution	2.9 - 2.12	
	F	Discussion (Air Pollution News Article)/Review **Quiz 2**	TBD	• Lab: Exp #5 UV-Vis Spectrum
2/20	M	**Exam 1**	0 - 2	• Lab: Exp #6 – Molecular Models.
	W	Greenhouse Earth, Why CO_2?	3.1 - 3.3	
	F	Why CO_2?, Carbon Cycle, Mass	3.4 - 3.6	
2/27	M	Moles, Other Greenhouse Gases, How Warm?	3.7 - 3.9	• Should have begun checking the quality of info included on web sites.
	W	Climate Change Consequences and Responses	3.10 -3.11	
	F	Electricity from Heat, Coal **Quiz 3**	4.1- 4.3	• Lab: Exp #11 – Biodiesel
3/5	M	Bond Energies, Petroleum	4.4 - 4.6	• Early Alert marks released.
	W	Gasoline, Alternative Ways of Using Coal	4.6 - 4.8	• Lab: Exp #11 – Biodiesel
	F	Alternative Fuels	4.9 - 4.11	
3/12	M	Discussion (Fossil Fuels in the News)/Review	TBD	• At least one paragraph of web project essay written.
	W	**Exam 2**	3 - 4	
	F	Water (properties, uses, sources, contamination)	5.1 - 5.4	• Lab: Exp #14 – Water Hardness
3/19		**SPRING BREAK**		
3/26	M	Ionic Solutes	5.5 - 5.8	• At least two paragraphs of web project essay written.
	W	Covalent Solutes, Purification of Drinking Water	5.9 - 5.12	
	F	Local Water Issues	PBS video?	• Lab: Exp #15 – Chloride in Water
4/2	M	Acid Rain, Acids, Bases, pH	6.1 - 6.4	• D2L drop box for web project opens
	W	Ocean Acidification, Measuring pH, SO_2	6.5 - 6.7	• Lab: Exp #17 – Effects of Acids
	F	NO_X, Nitrogen Cycle, SO_2 vs. NO_x	6.8 - 6.10	
4/9	M	Acid Deposition, Lakes and Streams **Quiz 4**	6.11 - 6.13	• Draft of all three paragraphs of web project essay written.
	W	Discussion (Water issues in the News)/Review	TBD	
	F	**Exam 3**	5 - 6	• Lab: Exp #18 – pH of Common Substances Dissolved in Water
4/16	M	Fracking for Natural Gas Recovery	News articles	• D2L drop box for Celebration of Scholarship extra-credit opens.
	W	Fracking for Natural Gas Recovery	Web resources, handouts	
	F	Fracking for Natural Gas Recovery	Web resources, handouts	• Lab: Handout – Detection and Identification of Organic Molecules (GCMS #1)
4/23	M	Energy and Batteries	8.1 - 8.2	• Web project due to D2L drop box by **FRIDAY** 5 PM.
	W	Battery Cradle-to-Cradle Analysis, Hybrid Vehicles	8.3 - 8.4	
	F	Fuel Cells	8.5 - 8.6	• Lab: Exp #22 – Electrochemistry
4/30	M	Photovoltaics, Renewables	8.7 - 8.8	• Celebration of Scholarship extra-credit essays due to D2L drop box by 5 PM **MONDAY**.
	W	Class Choice Topic (Mining, Fox River Cleanup or Drugs in Water)	TBD	
	F	Class Choice Topic	TBD	• Lab: GCMS Analysis (GCMS #2)
5/7	M	Class Choice Topic	TBD	• Lab Checkout.
	W	Class Choice Topic wrap-up/Review		
	F	**Exam 4**	Fracking, 8 & Class Choice	