STUDENT COURSE INFORMATION

Environmental Chemistry II

Chem 131

WINTER 2004

Instructor: Dr. Kim Bolton

Required Materials:

(a) Text Book (same as for CHEM 130):
i) Introduction to Environmental Chemistry, Nigel J. Bunce.
ii) Introduction to Environmental Chemistry - Answer Guide, N.J. Bunce

(b) Laboratory Manual: Laboratory Manual for Chem 131 can be purchased in the Chemistry Department.

(c) Electronic Calculator. Calculators or notebook computers capable of storing text information are not allowed in examinations.

(d) Additional Reading Material: Copies of some general chemistry text books are on reserve in the University Library. You may wish to consult these for additional reading or problems.

(e) Safety Goggles and Lab Coat are required and are available in the University Bookstore.

INTRODUCTION

In this course our objectives are two-fold: to complete your introduction to the chemical principles that govern chemical reactions in the environment, and to cover some additional problems in environmental chemistry. We remind you that environmental chemistry is not the same as pollution chemistry. We shall continue our study of the clean, or unperturbed, environment both because it is interesting in its own right, and because understanding the workings of the natural environment is an essential prerequisite to understanding the causes and possible remedies of specific pollution problems.

Please read through this information – it will answer most of your initial questions about Chem 131.

Lecturer: Dr. Kim Bolton
Office: Land Resource Science (Richards Building) 203
Telephone 519-824-4120, ext. 52531
Electronic mail: kbolton@uoguelph.ca

Lectures

Lectures will be held Monday, Wednesday and Friday at 4:30 pm in C&M 160.

It is essential that you attend ALL THREE MEETINGS of the class per week. Important announcements (e.g. exam locations) will be made at the beginning of some of these meetings. If you miss a meeting, it is your responsibility to find out if there were announcements.

Laboratory

The laboratory is an integral part of the course. Laboratories are held in C&M 158 and begin in Week 2 with an introduction to Safety and to the Workplace Hazardous Materials Information System (WHMIS). You must take your lab in the assigned time period. Your laboratory time and location appear on your timetable.

A brief quiz will be held during some of the lab sessions - see the laboratory schedule. It is essential that the experiment be studied carefully in advance of the laboratory period in which it is to be done.

Note: If you are repeating the course, you might qualify for a lab exemption.

Office Hours

Dr. Bolton will be available during her office hours for consultation and help. These hours will be announced during the first class meeting. Feel free to consult by phone or leave e-mail messages if you cannot attend in person. Please Note: Office hours are NOT to be regarded as a substitute for attending class.

Evaluation

Your course grade is made up of the following:

Mid-term Examination:	Wednesday, February 11, 4:30 p.m. (In class) (date subject to change)	40%
Laboratory		20%
Final Examination:	TBA	40%
		100%

Material covered on the examinations is cumulative. All tests and examinations will be closed book. No written or printed materials of any kind are permitted. Electronic calculators may be used on all quizzes and examinations.

Policy on Missed Exams

A grade of zero will be assigned for any missed midterm exam. Medical or compassionate reasons that may excuse you from the missed work can be considered only if you follow the correct procedure for requesting such an exemption.

For a missed midterm, documentation must be given directly to Dr. Bolton as soon as reasonably possible after the missed midterm. Do not request that academic counsellors or others mail the documentation to the Chemistry and Biochemistry Department. If you have consulted a medical practioner because of illness or injury, the doctor's note is acceptable documentation. However, there is no need to consult a doctor solely to obtain a note. If a valid excuse is received, the percent value of the midterm will be added to the final examination. No make-up midterm examination will be given.

Missed Final Examination

In the case of a missed final examination you should consult the Undergraduate Calendar for the appropriate course of action.

Lecture and Reading Schedule

Week	Lecture	Material covered in lecture	Reading	Problem Set
1 Jan. 5 – 9	1 2 3	Water Acids & Bases	Chapter 10 Chapter 11	 11
2 Jan. 12 – 16	4 5 6	Acid & Bases Buffers	 Chapter 11	 11
3 Jan. 19 – 23	7 8 9	Buffers Titrations	 Chapter 11	 11
4 Jan. 26 – 30	10 11 12	Alkalinity Solubility Equilibria	Chapter 11 Chapter 12	11 12
5 Feb 2 – 6	13 14 15	Solubility Equilibria	Chapter 12	12
6 Feb 9 – 13	16 17 18	Review Midterm (Feb 11 - in class) Free Energy	Chapter 13 Chapter 14	13 14
Feb 16 – 20		WINTER BREAK		
7 Feb 23 –27	19 20 21	Free Energy	Chapter 14	14
8 Mar 1 – 5	22 23 24	Free Energy Ozone Depletion	Chapter 14 Chapter 15	14 15
9 Mar 8 – 12	25 26 27	Ozone Depletion Electrochemistry	Chapter 15 Chapter 16	15 16
10 Mar 15 – 19	28 29 30	Electrochemistry	Chapter 16	16
11 Mar 22 – 26	31 32 33	Electrochemistry Electrochemistry	Chapter 16	16
12 Mar 29 – Apr 2	34 35	Metals & Mining Review	Chapter 17	17

Laboratory Schedule

Week			Quiz
2	Jan 12 - Jan 16	Sign-In, WHMIS	No
3	Jan 19 - Jan 23	Experiment 1: Properties of Acids and Bases Quiz on WHMIS	Yes
4	Jan 26 - Jan 30	Experiment 2: pH Titration Curves and Indicators	Yes
5	Feb 2 - Feb 6	Experiment 3: Properties of Buffers	Yes
6	Feb 9 - Feb 13	Experiment 4: Alkalinity of Water Solubility of Oxygen	No
	Feb 16 - Feb 20	**Winter Break**	
7	Feb 23 - Feb 27	Experiment 5: Solubility of Calcium Sulfate	No
8	Mar 1 - Mar 5	Experiment 6: Measurement of an Equilibrium Constant	Yes
9	Mar 8 - Mar 12	Experiment 7: Determination of ΔG°, ΔH°, and ΔS°	Yes
10	Mar 15 - Mar 19	Experiment 8: Voltaic Cells	Yes
11	Mar 22 - Mar 26	Experiment 9: Electrolysis	Yes
12	Mar 29 - Apr 2	Check-out	No

Problem Assignments

Chapter #	Questions
Chapter 11	
section 11.1	1; 2; 3; 4
section 11.2	1; 2; 3; 4; 6
section 11.3	all questions (2(b) and 3(c) - solve quadratic)
section 11.4	1; 2(a,b); 6; 7; 8; 9
section 11.6	1; 2; 3
section 11.7	1,2,4
section 11.9	1; 2; 3; 4; 5; 6; 7;
section 11.8	1; 2(not e); 4; 5; 6; 9; 10b
section 11.12	1; 3
Chapter 12	
section 12.2	2; 3; 6; 8; 11; 14
section 12.3	1; 2; 3; 4(not e); 5; 6; 7; 9; 10(a); 11(a,c); 14
Chapter 13	
section 13.1-13.3	1(a,b); 3; 5
section 13.5	1; 4(a,b); 6
section 13.6	1; 4
Chapter 14	
section 14.1-14.3	1; 2; 3; 6
section 14.4	1; 2; 3
section 14.5	1; 2; 3
section 14.6	2; 3; 5; 6
Chapter 15	
section 15.1-15.2	1; 2; 3; 6
section 15.3	1; 2; 3; 5
section 15.7	1(a,b); 4
Chapter 16	
section 16.1-16.2	1; 2; 3(a,b,c,e); 4(a,b,d)
section 16.3	2; 3; 4; 5; 6; 7(a,b); 8(a,b); 9
section 16.5	1
section 16.7	2; 4; 6