Introduction to Environmental Chemistry
CHEM 2240-1 (CRN 3141)
Spring Quarter, 2015

Instructor: Dr. J. Alex Huffman
Office: SGM 180
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Class Time: MWF, 9:00 – 9:50 AM
Class Location: Boettcher Center Auditorium 102
Office Hours: times TBD

Graduate TA: Marie Gosselin

REQUIRED COURSE ITEMS

Textbook: *Environmental Chemistry*, 5th Ed., by Baird and Cann; Freeman Publ.
Top Hat: Top Hat clicker/response software will be required (http://app.tophat.com/e/502735)
Calculator: You will need an inexpensive calculator that has the capability for square roots, logarithms, and exponents. You are responsible for understanding how to perform these operations on your calculator. Please bring your calculator with you to every class. Electronics with significant processors (laptops, cell phones, etc.), however, will NOT be allowed during exams and quizzes.

SUPPLEMENTAL COURSE ITEMS

Textbook: An additional General Chemistry text may be useful; any modern text will be sufficient. Scans of relevant supplemental material may be provided as necessary.

COURSE DESCRIPTION

Introduction to Environmental Chemistry is designed as the third of three core chemistry requirements for environmental science majors, although it is expected that a handful of other chemistry majors and students from other disciplines will be enrolled. The course is designed as a "survey" of topics in environmental chemistry; as such, we will not go into extreme detail on any one topic. The aim of the course is to introduce students to environmental chemistry issues and to expose ideas that will provide a basic framework to process complex issues that will face our world today and in coming years.

The course is comprised of both lecture and lab portions. One final grade will be assigned, weighted as a mix of the two portions. As a result, it is not possible to withdraw from lecture or lab independent of the other.

The course is not designed to be an upper division chemistry course; however, Dr. Huffman will assign assignments and tasks that will often be challenging and that will require significant effort and time. Chemistry courses are generally organized so that students put in ~2-3 hours outside of class per course credit hour. This means that for CHEM 2240 you should be prepared to spend ~6-9 hours outside of class per week. Topics are often cumulative, so please do not get behind.

LECTURE
The format of the class meetings will follow traditional lecture format on MWF. I will summarize new material and present illustrations and examples. You will be encouraged to practice problems during and after lectures. I will NOT be able to identify and describe every detail you read in the text and any supplemental materials. You will be expected to finish and understand assigned readings even if I have not gone over that material in great detail. However, I will emphasize important topics covered in the reading as well as problem solving strategies when appropriate. Please stop me at any time if you have questions.

OFFICE HOURS & TA HELP ROOM
I have posted hours when I will be available in my office for questions or issues related, or unrelated, to the course. These hours may be changed, if necessary, during the quarter, but this will be announced.

READING
Reading sections will be assigned and mentioned in lecture. You are encouraged to compete the assigned reading prior to the class lecture and often again after the lecture. In addition, you are also encouraged to attempt the example exercises throughout the text while completing the assigned reading. I recommend that you understand the material and how to solve the sample problems before proceeding to the next section. At the end of each chapter, a summary of important equations and terms is provided that should prove helpful in preparation for quizzes and exams.

OTHER GRADED ASSIGNMENTS
Additional assignments will be required and graded. These may be homework assignments of problems from the book or may be more conceptual or literature-research driven in nature. Some assignments will be individual efforts and others will require group work. Homework problems will often be more difficult than quiz or exam questions in order to make you think.

QUIZZES
Quizzes will be given periodically. Typically the date will be assigned at least one class period in advance, if not more. These quizzes will be administered to test student retention and understanding of course material in smaller chunks than would be required if a large portion of the course grade were from exams alone. Arrangements may be made to take the quiz at an alternative time only if you will miss class for a university sanction event. Missing quizzes for other reasons may result in a grade of zero for the quiz.

TOP HAT

We will utilize the Top Hat system for in-class feed-back, surveys, and some quizzes. It is mandatory that you sign up for Top Hat through their online portal. Follow emails and/or directions given in class. This will require use of your mobile phone or device, so please bring this with you daily to class. To minimize disruptions and distractions, however, I require that your phone NOT be in your hands or on your desk during the rest of class. More details will be given.

EXAMS
Approximately two (2) exams will be given during the quarter: one mid-term and one final exam. The dates of these exams will be given well in advance. **Under NO circumstances may the final be dropped or taken early**.

If you will be out of town for a University sanctioned function (e.g. athletic team or music group), you are responsible for making arrangements with Dr. Huffman at least one week in advance to take a quiz or exam at an alternative time. **Only in extremely extenuating circumstances, and with required documentation (e.g., letter from Student Health), will a make-up exam be given.**

GRADES

Your final grade will be earned according to your performance on a mix of assignments from both the lecture and laboratory portions of the course. The table below lists an estimate of the final break-down that will be used. Any changes will be announced in class. The final letter grade will be assigned based on the table of percentages listed here. I will not grade on a curve, but overall grade averages may be slightly increased if necessary in some cases.

Component	Percentage
Labs	25%
Assignments	15%
Presentation	10%
Top Hat + Quizzes	15%
Mid-Term	15%
Final Exam	20%
Total	*100%*

Grade	Percentage
A	93.0 - 100
A -	90.0 - 92.9
B +	87.0 - 89.9
B	83.0 - 86.9
B -	80.0 - 82.9
C +	75.0 - 79.9
C	69.0 - 74.9
C -	65.0 - 68.9
D +	62.0 - 64.9
D	58.0 - 61.9
D -	55.0 - 57.9
F	< 54.9

IMPORTANT DATES

March 23: Classes begin, Spring Quarter
May 15: Last day to drop ('W' on transcript)
May 25: Memorial Day (no class)
May 29: Last day of classes
June 03 (WEDNESDAY): Final Exam, 8:00 – 9:50 AM

SCHEDULE

Tentative detailed topic and reading schedule will be provided approx. Friday of first week.

A subset of the following topics/book chapters will be covered in approximately the following order, but in varying depths (tentative):
Introduction to chemical kinetics *(supplemental reading)*
Chapter 1: Stratospheric Chemistry: The Ozone Layer
Chapter 2: The Ozone Holes *(minimal)*
Chapter 3: The Chemistry of Ground-Level Air Pollution
Chapter 4: The Environmental and Health Consequences of Polluted Air – Outdoors and Indoors
Chapter 5: The Greenhouse Effect
Chapter 6: Energy Use, Fossil Fuels, CO2 Emissions, and Global Climate Change
Chapter 7: Biofuels and Other Alternative Fuels
Chapter 8: Renewable Energy Technologies: Hydroelectric, Wind, Solar, Geothermal, and Marine Energy and Their Storage
Chapter 9: Radioactivity, Radon, and Nuclear Energy
Chapter 10: The Chemistry of Natural Waters
Chapter 12: Toxic Heavy Metals
Chapter 13: Pesticides
Chapter 14: Dioxins, Furans, and PCBs

DISRUPTIONS
Tardiness is disruptive – please try to be to class on time.

CELLULAR PHONE AND MOBILE DEVICE POLICY
I respect the need for each individual to stay in contact with family and friends. The use of mobile devices, however, is disruptive to the learning environment. Thus, I request that the ringers of all cellular phones and other mobile devices be muted during class. If an emergency arises, and you need to make a call on your phone, I request that you quietly leave the room and conduct your conversation out in the hallway.

LECTURE AND TESTING ACCOMODATIONS
I will make every effort to accommodate students diagnosed with a learning disability. I will do this in complete confidence. I request that any student requiring these accommodations inform me the first week of class. For further information, please see the University Disability Services' website: http://www.du.edu/disability/dsp/index.html.

RELIGIOUS ACCOMODATION
University policy grants students excused absences from class or other organized activities or observance of religious holy days, unless the accommodation would create an undue hardship. Faculty are asked to be responsive to requests when students contact them *in advance* to request such an excused absence. Students are responsible for completing assignments given during their absence, but should be given an opportunity to make up work missed because of religious observance.

Once a student has registered for a class, the student is expected to examine the course syllabus for potential conflicts with holy days and to notify the instructor by the end of the first week of classes of any conflicts that may require an absence (including any required additional preparation/travel time). The student is also expected to remind the faculty member in advance of the missed class, and to make arrangements in advance (with the faculty member) to make up any missed work or in-class material within a reasonable amount of time.

See: http://www.du.edu/studentlife/religiouslife/DU_religious_accommodations_policy.html

ACADEMIC DISHONESTY & STUDENT SUPPORT
While I advocate collaborative learning and teamwork, I also firmly believe that each individual should maintain the highest ethical standards in all of life's endeavors. As such, I support and will strictly enforce the Honor Code of the University of Denver. See links for specific links below:
Pioneer Pledge: http://www.du.edu/studentlife/ccs/pledge.html
Honor Code Statement: http://www.du.edu/studentlife/ccs/honor_code_2011-2012.pdf

I also understand that every student has unique personal and educational needs. I will do my best to help you learn or appropriately facilitate your ability to work through personal issues. Please see the Office of Student Life (http://www.du.edu/studentlife/ccs/index.html), including the Pioneer Care program (http://www.du.edu/studentlife/care/), for more detailed resources.

Week #	Meeting #	Lecture #	Date	Week-day	Topic	Reading Section	Homework		Quizes	
							Available Date	Due Date	Topic Announce	Date
1	1	1	Mar 23	M	Introduction					
	2	2	Mar 25	W	Kinetics	Supplement				
	3	*L0*	Mar 26	Th	*Lab overvew and check-in*	-				
	4	3	Mar 27	F	Kinetics	Supplement	#1			
2	5	4	Mar 30	M	Class cancelled	Ch. 0 / Intro				
	6	5	Apr 1	W	Atmosphere and radiation	1.1-1.7				
	7	*L1*	Apr 2	Th	*Lab #1: Kinetics*	-				
	8	6	Apr 3	F	Stratospheric ozone chemistry, I	1.8-1.14		**#1**		
3	9	7	Apr 6	M	Stratospheric ozone chemistry, II	2.1-2.5, 2.8	#2		#1	
	10	8	Apr 8	W	Chemical equilibria and pH	Silb.: 17.1-17.2, 17.6				**#1**
	11	*L2*	Apr 9	Th	*Lab #2: Acid rain*	-				
	12	9	Apr 10	F	Acid rain	4.1-4.6		**#2**	#2	
4	13	10	Apr 13	M	**Guest lecture: Dr. Dunlea**	-	#3			**#2**
	14	11	Apr 15	W	Atmospheric oxidation, I	3.1-3.6				
	15	*L3*	Apr 16	Th	*Lab #3: CO_2 solubility*	-				
	16	12	Apr 17	F	Atmospheric oxidation, II	3.10-3.12		**#3**	#3	
5	17	13	Apr 20	M	Atmospheric oxidation, III	-				**#3**
	18	14	Apr 22	W	Particulate matter, I	3.22-3.28			#4	
	19	*L4*	Apr 23	Th	*Lab #4: EDTA titrations*	-				
	20	E	Apr 24	F	**Exam #1**					
6	21	15	Apr 27	M	Particulate matter, II	3.22-3.28	#4			
	22	16	Apr 29	W	Greenhouse effect	5.1-5.12				**#4**
	23	*L5*	Apr 30	Th	*Lab #5: Greenhouse effect*	-				
	24	17	May 1	F	Greenhouse: IR radiation, I	5.1-5.12		**#4**		
7	25	18	May 4	M	Greenhouse: IR radiation, II		#5			
	26	19	May 6	W	Climate change, I	5.20-5.30			#5	
	27	*L6*	May 7	Th	*Lab #6: Fuel cell cars*	-				
	28	20	May 8	F	Climate change, II	5.20-5.30		**#5**		**#5**
8	29	21	May 11	M	Global energy and fracking	6.1-6.10	#6			
	30	22	May 13	W	Biofuels	7.1-7.8				
	31	*L7*	May 14	Th	*Lab #7: Biofuels*	-				
	32	23	May 15	F	Radioactivity, Nuclear Energy	9.1-9.9		**#6**	#6	
9	33	24	May 18	M	Chemistry of natural waters, I	Ch. 10/11 TBD	#7			**#6**
	34	25	May 20	W	Chemistry of natural waters, II	-				
	35	*L8*	May 21	Th	*Lab #8: Radon*	-				
	36	26	May 22	F	Toxic heavy metals	Ch. 12 TBD		**#7**	#7	
10	37	-	May 25	M	***Memorial Day: No Class***		#8			
	38	27	May 27	W	Pesticides	Ch. 13 TBD				**#7**
	39	*L9*	May 28	Th	***Lab #9: Group Presentations***	-				
	40	28	May 29	F	Course Review	-		**#8**		
	41	**-**	**Jun 3**	**W**	**FINAL EXAM, 8:00 - 9:50 AM**					