

# ESM 230: Fundamentals of Environmental Chemistry I

Fall 2023

**Instructor:** Professor L. A. George

**Office Hours:** Monday 3-4 PM, or by appointment (after class is a good time), SRTC 474

**Contact info:** e-mail - georgeL@pdx.edu, phone: 503-725-3861

Campus e-mail is best (not Canvas), please put the "ESM 230: your last name" in subject line

## Teaching Assistants:

- Monica Zapata-Villegas [mzapata2@pdx.edu](mailto:mzapata2@pdx.edu)
- Punyotoya Paul [punyo@pdx.edu](mailto:punyo@pdx.edu)

## Required Textbook:

- **21st Century Chemistry, Kimberley Waldron, 2nd edition -- online access required see Canvas**

## Other requirements:

- Scientific calculator (has log, inverse log, exponential notation, etc.) -- YOU CANNOT USE YOUR PHONES FOR QUIZZES OR EXAMS

Suggestions for calculators: Casio FX-260, Texas Instruments TI-30Xa

## Course Description:

The course will cover basic concepts and principles of chemistry as they apply to environmental problems. This will include the nature of matter, atomic, molecular, ionic and radical structures, stoichiometry and equilibrium, precipitation, acid-base and redox reactions.

In the second term of the course, we will apply this understanding to explore water chemistry, water pollution, atmospheric chemistry, soil chemistry, toxicological chemistry and industrial ecology. Examples will be used that illustrate the social and economic importance of environmental chemistry.

This course is taught in-person with material in the required textbook **and** lecture.

You must also be registered and successfully participate in the ESM 230 recitation session to complete this course.

Environmental Science students must complete ESM 230, 231 and 315 to fulfill the chemistry requirement.

## Course Learning Objectives:

- Apply significant figure rules in all calculations providing the correct number of significant numbers and units.
- Convert between different units using conversion factors and dimensional analysis
- Recognize basic chemical symbols for chemical elements and common ions
- Explain how atomic structure predicts reactivity and bonding
- Explain the principles underlying the organization of the periodic table
- Employ stoichiometry to solve chemical problems
- Explain how properties of matter, gas laws, thermodynamics, acid/base reactions, and oxidation/reduction reactions apply to environmental systems or problems.

**Tentative Schedule:**

You should read the chapter beforehand (the weekend before). This will make it much easier for you to follow the lecture material and the exercises we do in class.

<b>Week</b>	<b>READ 21st Century Chapters</b>	<b>On-Line HOMEWORK Due on Mondays at 11:59PM</b>	<b>IN-CLASS QUIZ (Tuesdays at 2PM)</b>	<b>In person Recitation Sections (Group problems)</b>
1	Chapter 1	none	none	Rec #1
2	Chapter 2	HW #1	Quiz #1	Rec #2
3	Chapter 3	HW #2	Quiz #2	Rec #3
4	Chapter 4	HW #3	Quiz #3	Rec #4
5	Catch-up/Review	HW #4	<b>Tuesday Quiz #4 Midterm Thursday Oct. 25th</b>	<b>Free</b>
6	Chapter 7 Chemical Reactions		HW #4 Chapter 6 problems 1-21	Rec #5
7	Chapter 8 Water	HW #5	Quiz #5	Rec #6
8	Chapter 9 Aqueous Solutions	HW #6	Quiz # 6	Rec #7
9	Chapter 10 Acid-Base Buffers, Neutralization	HW #7	Quiz #7	Free (Thanksgiving)
10	Oxidation- Reduction/Cat ch-up/Review	HW #8	Quiz #8	Rec #8
<b>Finals week</b>	<b>Cumulative Final</b>		<b>Monday December 4th 10:15-12:05</b>	

There will be no class on:

November 23 2023

**Assignments:**

8 weekly homework assignments @ 25 pts each	175pts. (drop 1)
8 quizzes, 10 pts each	70 pts. (drop 1)
8 Recitation sessions, 10 pts each	70 pts (drop 1)
Mid-term exam, October 25th	125 pts.
Cumulative Final exam, December 3rd 1015-1205	150 pts.
Total for Course	590 pts.

Late assignments will be penalized 5%/day (assignments are due at the beginning of class) up to the point solutions are posted, after posting there will be zero credit. If you have an extended illness or other emergency, let us know and we will discuss other deadline arrangements. **Please do not e-mail late assignments. Turn in late assignments in the HW mailbox outside of the ESM office (SRTC 218) with your name, course and TA's name.**

There will not be any makeup quizzes or recitation. Make-up midterm will only be offered for verifiable medical emergencies.

**Grading Scale:**

A 94 – 100	B+ 87 – 89	C+ 77 – 79	D+ 67 – 69
A - 90 – 93	B 83 – 86	C 73 – 76	D 63 – 66
	B- 80 – 82	C- 70 – 72	D- 60 – 62

**Resources for Chemistry:**

Mathematics for Chemistry :

- <http://www.shodor.org/unchem/math/>

Sample of online chemistry resources:

- <http://www.chem1.com/chemed/genchem.shtml#B1>
- <http://exercises.murov.info/chemexercises.htm>
- Khan Academy - excellent tutorials and problem sets for chemistry and mathematics used in chemistry  
<https://www.khanacademy.org/>

### **Policies and Expectations:**

- Cell phones and pagers must be turned to silent while in class.
- If you are absent, you are responsible for the material covered in your absence. It is up to you to get notes, handouts, and/or assignments, and to make up work that you missed.
- You are expected to arrive on time and be prepared.
- It is my responsibility to foster a dynamic learning environment where free and open exchange of ideas is encouraged. This cannot occur in a class where cheating is condoned. Please ask questions and use my office hours or contact me to schedule an appointment.

**Academic Honesty:** Plagiarism or academic dishonesty of any form will not be tolerated in this class and will result in a failing grade for the assignment. All disputed cases of academic dishonesty will be referred to the Office of Student Affairs for arbitration. For more information, please see the Academic Honesty Policy in Portland State University's "Bulletin".

Any cheating or attempted cheating will result in an automatic grade of zero for that particular assignment, quiz, or exam. Plagiarism tutorial: <http://plagiarism.duke.edu>

### **Sex/Gender Discrimination, Sexual Harassment and Interpersonal Violence:**

Portland State is committed to fostering a safe, productive learning environment. Title IX and our school policy prohibit discrimination on the basis of sex, which regards sexual misconduct — including harassment, domestic and dating violence, sexual assault, and stalking. We expect a culture of professionalism and mutual respect in our department and class. ***Please be aware that as a faculty member, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination to PSU's Title IX Coordinator, the Office of Equity and Compliance or the Dean of Student Life and cannot keep information confidential.*** You may report any incident of discrimination or discriminatory harassment, including sexual harassment, to either the Office of Equity and Compliance or the Office of the Dean of Student Life. If you would rather share information about sexual harassment or sexual violence to a confidential employee who does not have this reporting responsibility, you can contact a confidential advocate at 503-725-5672 or by scheduling on-line ([psuwrc.youcanbook.me](http://psuwrc.youcanbook.me)) or another confidential employee found on the sexual misconduct resource webpage. For more information about your obligations and resources for sex/gender discrimination and sexual violence (Title IX), please complete the required student module Creating a Safe Campus in your D2L.

### **Access and Inclusion for Students with Disabilities:**

PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, useable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. The Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment.

If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations. The DRC is located in 116 Smith Memorial Student Union, 503-725-4150, [drc@pdx.edu](mailto:drc@pdx.edu), <https://www.pdx.edu/drc>.

- If you already have accommodations, please contact me to make sure that I have received a faculty notification letter and discuss your accommodations.
- Students who need accommodations for tests and quizzes are expected to schedule their tests to overlap with the time the class is taking the test.
- Please be aware that the accessible tables or chairs in the room should remain available for students who find that standard classroom seating is not useable.

For information about emergency preparedness, please go to the [Fire and Life Safety webpage](https://www.pdx.edu/environmental-health-safety/fire-and-life-safety)(<https://www.pdx.edu/environmental-health-safety/fire-and-life-safety>) for information.

### **New Mandatory Safe Campus Online Training Module**

If you have not done so already, please complete the Safe Campus Module in D2L. The course is titled "Creating a Safe Campus: Preventing Gender Discrimination, Sexual Harassment, Sexual Misconduct and Sexual Assault."

As of Fall, 2014, PSU requires all students to take the learning module entitled "Creating a Safe Campus: Preventing Gender Discrimination, Sexual Harassment, Sexual Misconduct and Sexual Assault." The module should take approximately 45 minutes to complete and contains important information and resources.

If you or someone you know has been harassed or assaulted, you can find resources on PSU's Enrollment Management & Student Affairs: Sexual Prevention & Response website at <http://www.pdx.edu/sexual-assault>. PSU's Student Code of Conduct makes it clear that violence and harassment based on sex and gender are strictly prohibited and offenses are subject to the full realm of sanctions, up to and including suspension and expulsion.

If you are having technical difficulties with the module contact OIT's help desk at 503-725-HELP (4357) or [help@pdx.edu](mailto:help@pdx.edu). If you have any questions about the module requirement refer to Safe Campus Module FAQs or contact [saveact@pdx.edu](mailto:saveact@pdx.edu). Do not contact your instructor.