



Environmental Chemistry

CHEM3500

Daniel B. Short, Ph.D.

Environmental Chemist

215 John Jay
Robert Morris University
Moon Township, PA 15108

Tel: 412-262-8260

Email: Short@rmu.edu



CHEM3500: Environmental Chemistry Syllabus

Contact Information

Instructor: Dr. Daniel Short

Office: 215 John Jay

Laboratory: John Jay Science Laboratories
(Environmental Science and Chemistry)

Office Phone: (412) 262-8260

E-mail: short@rmu.edu

(Please include your lecture section number in your messages to me. You must use your @rmu.edu mailbox.)

Office/Lab Hours: <http://www.localendar.com/public/dnashort>. Also by appointment. Students are encouraged to see me immediately after class.

Web Site: <http://academics.rmu.edu/~short/index.htm>

Course Description

This course provides students with an introduction to the chemical basis of environmental issues and the environmental consequences of modern technology with an emphasis on the sources, reactions, transport, effects and fates of chemical species in water, soil and air environments. Areas covered include: tropospheric and stratospheric chemistry, toxic organic and inorganic pollutants in the environment, the chemistry of natural waters, and environmental analytical techniques.

Introduction

The overall goal of this course is to gain an understanding of the fundamental chemical processes that are central to a range of important environmental problems and to utilize this knowledge in making critical evaluations of these problems.

Connections

Chemistry is central to all sciences and is used to study biological, physical, medical and environmental phenomena. In order to widen your knowledge base and deepen your understanding of chemistry, it is important that you seek to make connections between the facts, principles, and theories, etc. expressed in this course.

In addition, it is also very important to make connections with people. Personal connections with fellow students, faculty, advisors, and others in our community will greatly enhance your academic progress and personal maturity.

Course Format

During class sessions the course material will be presented in a lecture format. We will discuss principles, present demonstrations, examine theories, and work through example exercises.

- (i) To prepare for lecture you should read the chapter in advance.
- (ii) Bring your course guide to every lecture.
- (iii) During lecture take notes on everything presented.
- (iv) After lecture you should review your notes and work on the suggested homework exercises.
- (v) Selected lectures use visual media.

Course Outline (Subject to change)

	M	W	F
1	Intro Session	Chemical Principles	
	INTRODUCTION		
2	Introduction		
	CHEMISTRY OF THE ATMOSPHERE		
3	Sources	Photochemistry	Troposphere
4	Trop. Oxidation	Sulfur	Halogens
	CHEMISTRY OF FRESHWATERS		
5	Fundamentals	Fundamentals	Fundamentals
6	Case Studies	Case Studies	Case Studies
	CHEMISTRY OF THE OCEANS		
7	Introduction	Composition	Suspended Particles
8	Estuaries	Contamination	Contamination
	CHEMISTRY OF THE SOLID EARTH		
9	Introduction	Components	pH and Redox
10	Chemical Reactions	Chemical Reactions	Chemical Reactions
	ENVIRONMENTAL ORGANIC CHEMISTRY		
11	Introduction	Diversity	Fate
12	Partitioning	Partitioning	Transformations
	Thanksgiving		
	BIOGEOCHEMICAL CYCLING		
13	Introduction	Rates	Transfer
14	Biogeo Cycles	Behavior	Behavior

Attendance

Attendance of each scheduled lecture session is strongly advised. If you are absent when a test is scheduled you are required to provide me with documentation (note from doctor, health center, or appropriate College administrator); tests must be made up within 72 hours. A test missed because of an unexcused absence cannot be made up.

Changes in the class schedule, information on coursework, tests and other notices will be given in the lectures and via the RMU email system. It is **your** responsibility to keep up-to-date with these changes.

Participation and Active Learning

I expect students to attend class regularly and to be on time. You are encouraged to be an actively engaged member by answering questions, raising questions, initiating discussions and being prepared to share your knowledge with the class. While class participation is not an explicit component of your grade in this course, students who are actively participating on a regular basis and who are on the border between two grades will receive the higher of the two possible grades.

The chosen textbook should not be used as the sole source of information. Additional texts, journals, the Internet, library and other media should all be sought out as a way of enriching your learning experience.

You should plan on spending about 4-6 hours a week working on chemistry. It is to your advantage to spread this time out evenly over all the days in a week, rather than trying to spend 4-5 hours in a single day once a week.

More suggestions for success in this course are provided in this document.

Disturbances

As a student you have the right to hear the lectures and the class discussions. Every student should respect the rights of others in their class. Therefore, I reserve the right to **lower** the grade or **dismiss** from class anyone exhibiting improper behavior which disturbs the class. This includes, but is not limited to: arriving late to class (tardiness), leaving early (reverse tardiness), consumption of food (drinks allowed), use of cell phones, and disturbing others through talking.

LATE ARRIVAL TO CLASS is discouraged. It disrupts the other students and the instructor. Never disrupt a class in progress. It is disrespectful to both your professor and fellow students.

Assessment

This course will be assessed on the basis of coursework assignments

Grading:

A 93-100 - Outstanding. A thoroughly comprehensive, well-organized and well-written answer or exercise. (Some degree of originality of ideas and treatment may compensate for deficiencies in coverage and organization.)

A- 89-92

B+ 86-88

B 83-85 - Achievement significantly above the level necessary to meet course requirements; coverage, organization and writing satisfactory.

B- 80-82

C+ 77-79

C 70-76 - Achievement meets course requirements, i.e., an evident understanding of the material presented, even with minor deficiencies of coverage, organization, and/or writing.

D 60-69 - Achievement worthy of credit even though course requirement is not fully met, and coverage organization, and/or writing show clearly evident deficiencies.

F <60 Performance indicating that there are serious deficiencies in a student's understanding of the course material, usually accompanied by poor coverage, lack of organization, and/or inadequate writing.

Coursework

Problems and worksheets must be handed in on their respective due dates and in legible condition. Write down the full question followed by your answer; include all steps in your calculations. **Late homework will not be graded**; I also observe the right not to grade incomprehensible work or calculations with intermediate steps missing. I will only be grading a random sample of questions from the homework and your grade for each chapter will only be assigned according to the questions graded.

Attending lectures and reading the text book is not an adequate means to learn chemistry. You must make every effort to attempt the questions and problems in the homework and worksheets. Problem solving is an essential skill in chemistry and the only way to improve your problem solving skills is practice. Consider working together with other students. You can get extra help from anyone.

Academic Honesty

In this course you are encouraged to study with other students. When taking the tests you are to work alone, in addition, your **submitted homework must be all your own work** and should not resemble another students.

Copying material from other students, the Internet or other sources and submitting it towards the grade in your course is unacceptable, does not qualify as being your own work and is viewed as plagiarism.

Every student at Robert Morris University should make themselves familiar with the University's code of conduct in regards to academic honesty. Any violations of this code in terms of cheating or plagiarism will be investigated fully, with the maximum penalty of failing the course.

Recommended Materials

Text – Harrison, R.M. (2008) *Principles of Environmental Chemistry*. Royal Society of Chemistry, Cambridge, UK.

Calculator - A scientific calculator is required. Programmable calculators are acceptable during tests as long as they do not contain in any of their storage devices the course material subject to the testing. You cannot share a calculator during a test. Computers (laptops, notebooks, etc.) cannot be used during tests. Have a calculator and a pad for calculations ready for each class period.

Stationary - For tests it is assumed that everybody will use a pen. Only answers written in permanent ink can be reconsidered if you suspect an error in grading or expect reconsideration for partial credit).

Learning Aids

Communicate with your instructor – you should take full advantage of the availability of your instructor outside of the classroom for face-to-face meetings and via telephone/email contact.

Cooperative learning Groups – students are asked to form groups of 4-5. Groups should sit together when requested. Group discussions, exercises, and assignments may occur in lecture. Each group may find it helpful to study together outside of class.

Discussion sessions – these informal sessions are held 1-3 times during the semester. The aim is to enable the professor to meet students in small groups. The sessions are open to all those registered in this lecture session. Topics of discussion may or may not be related to course materials.

University Center for Student Success – students who may be eligible to receive learning support or physical accommodations should contact the Center for Student Success. To learn more about their services, call (412) 262-8349 or visit their offices in Franklin Center.

Disability

Your success as a student is of utmost importance to me. Students with special requirements that can be accommodated and are covered by the Students with Disabilities Act should contact the instructor.

Copyright Information

This is not a department syllabus. It is the property of Dr. Daniel Short based on the University's course description for CHEM3500. It is not to be shared/distributed to prospective or present full or part-time CHEM3500 faculty without the written permission of Dr. Daniel Short.

No Food or Phone Calls are Permitted in the Classroom



Suggestions For Success

1. Read the text book the day before the class where this material will be discussed.
2. Read to find out "why?" in addition to "what?"
3. Don't miss a lecture. Attend class regularly and never be late!
4. Sit near the front of the class, so that you feel like a participant, not merely a passive observer.
5. Take notes on virtually EVERYTHING that is said, discussed, or put on the board in class.
6. Review your notes after the lecture, to make sure that you understand what you wrote and to identify anything that is confusing or not clear. If you don't understand part(s) of your notes, look up the topic in your book and/or come see me, and/or a tutor, and/or your study group.
7. Ask questions in class. This will help you feel a part of the class, instead of watching others learn.
8. Set up your schedule so that you are able to devote approximately one hour each day to working on chemistry.
9. As you work on understanding new concepts, be sure to take time to make connections that identify how new ideas fit with earlier material.
10. Organize a study group of 3 or 4 friends with whom you review class material 2 or 3 days prior to the tests.

Student Search

Each person may only sign your page once!!!

Has shoulder length hair. (1 point)	Is wearing shorts/short pants. (1 point)	Is wearing sandals. (1 point)	Is older than you. (1 point)	Has a cell phone with them. (1 point)
Wears contact lenses. (1 point)	Is sitting in the front row. (1 point)	Has four letters in his/her first name. (1 point)	Has a last name that starts with a 'B'. (1 point)	Has taken a class from me before. (1 point)
Wearing at least 3 items of jewelry. (2 points)	Has the text book with them. (2 points)	Is from a different country. (2 points)	Has a 20 dollar bill in their pocket. (2 points)	Is carrying a different text book. (2 points)
Has more than 7 letters in his/her first name. (3 points)	Walks or Bikes to class. (3 points)	Is wearing an RMU T-Shirt. (3 points)	Is the youngest person in the room (3 points)	Has: Pen, pencil, note book, calculator, and the text with them. (3 points)

When I tell you time is up, count your points.
How many points total do you have? _____

CHEM3500: First Day 'Fill-In' Sheet

1. Name: _____
 2. How do you want to be called? _____
 3. Lecture Section: _____ Lab Section: _____
 4. EMAIL address: _____ @ rmu.edu
 5. Your dorm, cell, or home phone: _____
- If you don't remember, send me an e-mail message.
(If you don't have a rmu email account, sign up for one at the computer center).
6. Year in school (please check one): (Fr) (So) (Jr) (Sr)
 7. Check one: (a) new student; (b) continuing student;
(c) transfer from (name of your previous school) _____
 8. Your major: _____ minor: _____ undecided:
 9. Number of high school chemistry years completed: 0 1 2 3 AP
Indicate year of last high school chemistry course: _____
 10. Name and location of high school: _____
 11. Give the number of college chemistry courses taken: 0 1 2 3
 12. Give the number of credit hours you are taking this semester: _____
 13. Give the number of hours per week you are working (paid or volunteer): _____
 14. Rate yourself in terms of listening and note taking skills
(A) Average; (B) Better than average; (C) Need help
 15. Rate yourself in terms of reading, comprehension, and retention
(A) Average; (B) Better than average; (C) Need help
 16. I plan to take another chemistry course beyond this: Yes No Don't know
 17. You are recommended to have a buddy system in this class. Do you know other persons in this class:
(Yes) Names: _____ (No)
 18. Please tell me a couple of interesting things about yourself.

When completed, please return to the instructor. Thank you.