

# **NATURAL SCIENCE I: ENERGY AND THE ENVIRONMENT**

**CORE-UA 203 001  
Fall 2015**

**Monday and Wednesday  
2 – 3:15 p.m.  
Silver 207**

**Professor Marc Walters**

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**Office Hours: Mon. and Thurs. 3:30 – 4:30 pm**



## 1. Course Description

This course explores the scientific foundations of current environmental issues and their implications for public policy. The syllabus is divided into sections that examine a current environmental theme in depth. The first sections investigate the composition of the atmosphere and the chemical processes that cause air pollution, ozone depletion, and global warming. Moving to the study of water, the course explores the properties of this unique solvent, the effect of various aqueous pollutants, and the origin of acid rain. The course also includes an investigation of energy – e.g., energy from chemical reactions, our continuing reliance on fossil fuels, nuclear power, and the potential of alternative energy sources. The laboratory experiments are closely integrated with the lecture topics and provide hands-on explorations of central course themes. Throughout the course we also examine how scientific studies of the environment are intimately connected with political, economic and policy concerns.

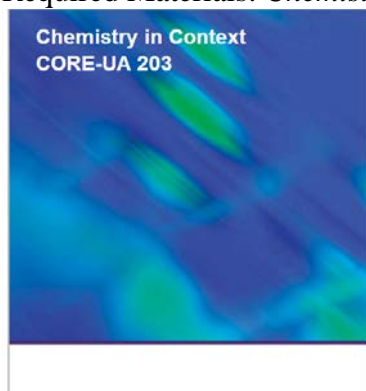
## 2. Course Objectives

Your learning objectives for the course are:

- Acquire knowledge of foundational concepts, processes, and terminology in chemistry.
- Develop skills in problem solving and use of quantitative reasoning.
- Understand the methods of scientific investigation, including the roles of experiments and computer simulations.
- Critically evaluate new advances in our understanding of environmental science as reported by news media.
- Address the complex economic, political, and policy aspects of environmental issues.

## 3. Course Materials

Required Materials: *Chemistry in Context 7e*, Custom Edition for NYU



**ISBN: 9781308172255. This text is only available at the NYU Bookstore and contains all package components necessary for this course.**

In addition, the Lab manual is required, which is also available from the NYU Bookstore:

Marc Walters, *Laboratory Manual for Energy and the Environment*.

**Connect Plus** provides additional study material and practice problems. It is available with your textbook. You are encouraged to explore it.

- **Connect Plus:** To register, go to:
- <http://connect.mheducation.com/class/m-walters>
- 
  
- Click the “Register Now” button
- Enter your NYU e-mail address
- Enter the Connect Access Code found in your textbook
  
- For technical issues with registration, call **800-331-5094** or go to [www.mhhe.com/support](http://www.mhhe.com/support)

We will also read up-to-date articles on **current environmental topics** from the mainstream media (e.g., *New York Times*) and scientific literature (e.g., *Science*, *Nature*).

You will also need to purchase **safety glasses** from the NYU bookstore. Many of the laboratory sessions will require you to use chemicals that are potentially damaging to your eyes, so **SAFETY GLASSES ARE ABSOLUTELY REQUIRED DURING THESE LABS.**

**REMEMBER TO BRING YOUR SAFETY GLASSES TO THE LAB SESSIONS!**

## 4.

**Lecture Schedule**

Date	Chapter	Title	
<b>Introduction Chap. 0</b>			
Wed Sept 02	Class 01	0	pp. 3 - 13
<b>The Air We Breathe Chap. 1</b>			
Wed Sept 09	Class 02	1	pp. 17 - 30
Mon Sept 14	Class 03	1	pp. 30 – 49, HW
Wed Sept 16	Class 04	1	pp. 49 – 57, Review
<b>Protecting the Ozone Layer Chap. 2</b>			
Mon Sept 21	Class 05	2	pp. 65 - 75
Wed Sept 23	Class 06	2	pp. 75 – 85, HW due
Mon Sept 28	Class 07	2	pp. 85 - 92
Wed Sept 30	Class 08	2	pp. 92 -101, HW
<b>The Chemistry of Global Climate Change Chap. 3</b>			
Mon Oct 05	Class 09	3	pp. 107 -116
Wed Oct 07	Class 10	3	pp. 116 -130, HW
Tue* Oct 13	Class 11	3	pp. 130 -142
Wed Oct 14	Class 12	3	pp. 142-147, HW
<b>Energy from Combustion Chap. 4</b>			
Mon Oct 19	Class 13	4	pp. 155 -166
Wed Oct 21	<b>Midterm Exam 1 (Covers Chaps. 1 - 3)</b>		
Mon Oct 26	Class 14	4	pp. 166 -178
Wed Oct 28	Class 15	4	pp. 178 -195, HW
<b>Water for Life Chap. 5</b>			
Mon Nov 02	Class 16	5	pp. 203 - 216
Wed Nov 04	Class 17	5	pp. 216 – 227, HW
Mon Nov 09	Class 18	5	pp. 227 - 234
Wed Nov 11	Class 19	5	pp. 234 – 241, HW
<b>Energy from Electron Transfer Chap. 8</b>			
Mon Nov 16	Class 20	8	pp. 335 - 347
Wed Nov 18	<b>Midterm Exam 2 (Covers Chaps. 3 – 5)</b>		
Mon Nov 23	Class 21	8	pp. 348 - 356
Wed Nov 25	Class 22	8	pp. 356 – 364, HW
Mon Nov 30	Class 23	8	pp. 364 - 366
<b>The Fires of Nuclear Fission Chap. 7</b>			
Wed Dec 02	Class 24	7	pp. 287 – 302, HW
Mon Dec 07	Class 25	7	pp. 315 - 327
Wed Dec 09	Class 26	7	Japan's Choice, France's Dilemma, Germany and USA
Mon Dec 14	The Energy Overview		
Mon Dec 21	<b>Final Exam 2:00 – 3:50 p.m. Rm 207 (Covers Chaps. All Chaps.)</b>		

## Laboratory Schedule

**8/31-9/1: NO LAB**

**9/7-9/8: MATH REVIEW**

**9/14-9/15: PROPERTIES OF AIR**

**9/21-9/22: PROPERTIES OF LIGHT**

**9/28-10/29: SUNSCREENS**

**10/5-10/6: MOLECULAR STRUCTURE AND VIBRATIONS**

**10/12-10/13: NO LAB - FALL BREAK**

**10/19-10/20: FIRST MIDTERM REVIEW**

**10/26-10/27: ENERGY CHANGES DURING CHEMICAL REACTIONS**

**11/2-11/3: AQUEOUS IONS**

**11/9-11/10: WATER HARDNESS**

**11/16-11/17: SECOND MIDTERM REVIEW**

**11/23-11/24: BUILDING BATTERIES**

**11/30-12/1: SOLAR CELLS AND FUELCELLS**

**12/7-12/8: FINAL REVIEW**

(Final exam is cumulative with special focus on Chapters 5, 7 and 8)

## 5. Grade Allocation

First Midterm Exam	15 %
Second Midterm Exam	15 %
Final Exam	25 %
In class assignments	5 %
Laboratory	25 %
Homework	15 %

## 6. Exams and In-class assignments

**Midterm Exams**      **Wed. October 21, and Wed. November 18**  
**Final Exam**        **Mon. December 21, 2:00 – 3:50 p.m.**

The exams will contain questions drawn from the **lectures, readings, and laboratory projects**. **Study questions** for the lecture topics will be distributed regularly during the semester. The final

exam will be **cumulative** and will cover topics from throughout the course.

If you will miss a midterm exam or in-class assignments because of illness, you must contact Professor Walters by e-mail **before the start of the exam** or class and provide a doctor's note explaining your absence. **No make-up exam** will be given for a missed midterm exam. Instead, the final exam will count for 40% (missed midterm exam) of your course total.

The final exam **date is set by the NYU Registrar's Office and no alternative date are provided.** A make-up will be given for the final exam only under exceptional circumstances that must be discussed with Professor Walters prior to the exam. In the rare cases where approval is granted, a grade of incomplete will be given for the course and the make-up will be scheduled for the following semester.

In-class assignments will be graded according to your grasp of the material in question.

## **7. Homework**

The homework assignments will contain questions that review the course material and/or questions that relate to the laboratory projects. Certain questions on the homework assignments may require you to access information on relevant web sites.

If you miss a lecture or laboratory session due to a documented absence you are still required to complete the homework assignment. Contact your laboratory instructor to arrange a suitable deadline for submitting the work.

Completed homework assignments **must be returned in THE INDICATED LAB SECTION within 5 minutes of the beginning of lab** (typically one week after assignment). Deposit your completed assignment in the box corresponding to your laboratory instructor as you enter the classroom.

The laboratory sessions will be held in **Silver 202** and will begin on **Tue. Sept. 09/08**. There are no laboratory sessions during the first week of class. The laboratory instructors are listed below.

### **Instructors:**

Carbery, William  
Chen, Peiyang  
Li, Yuantao

### **Lab sections:**

2	M 5 pm-6:40 pm
3	T 9 am-10:40 am
4	T 11 am-12:40 pm
5	T 1pm -2:40 pm
6	T 3 pm-4:40 am
7	T 5 pm-6:40 pm

**You must be registered in a laboratory section in order to receive credit for the course.** The sections have a capacity of 20 students, which is determined by safety issues and availability of laboratory equipment. The section enrollment will not be increased. If you are not appropriately

registered for a laboratory section by project #2 you will be required to drop the course.

Each weekly lab project is worth 50 points:

<b>Attendance</b>	<b>10 points</b>
<b>Quiz</b>	<b>10 points</b>
<b>Lab Assignment</b>	<b>30 points</b>

***Attendance Credit:***

You are expected to arrive punctually for the beginning of the lab session and arriving more than **10 minutes late** will result in a loss of attendance credit for the session.

***Laboratory Quiz:***

Questions will be based on the introduction to the experiment in the laboratory manual. Arriving more than 10 minutes late for the lab will exclude you from taking the quiz.

***Laboratory Assignment:***

This assignment should be completed and submitted during the laboratory period by working collaboratively with your laboratory partners. Some laboratories may have a take-home component in addition to the in-lab exercises.

You will be at a disadvantage in the course if you miss **any** of the lab sessions. If you cannot attend a lab session because of serious illness or because you are observing a religious holiday, **you must notify your lab instructor before the start of the lab**. Unexcused lab absences will result in loss of credit for the lab session. Because of the logistics of using the laboratory room, **no make-up labs are possible**. Permission to attend another lab section to complete a lab project will only be given under special circumstances that must be discussed with Professor Walters and your lab instructor in advance.