

Natural Science I: Energy and the Environment

V55.0203 – Fall 2004

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I. Introduction

This course explores the scientific foundations of current environmental issues and their challenges for public policy. One goal of the course is to address directly many topics of crucial importance and current lively debate in our technology-based society, such as global warming, the quest for clean air and water, atmospheric ozone depletion, and the continuing search for viable sources of energy. A parallel aim is to impart a basic understanding of key chemical and physical concepts such as the structure of atoms and molecules, the interaction of light with matter, energy relationships in chemical reactions, and the properties of acids and bases. As you will see, these concepts are introduced within the context of the discussion of the relevant environmental problems and will help you gain a fuller understanding of these problems. At the end of the course we hope that you will have gained an appreciation and hopefully an interest in the role of chemistry in our world, and that you will have acquired an intelligent and informed perspective with regard to environmental and energy-related issues.

II. Textbooks

There are two required texts for this course. The lecture text is Chemistry in Context: Applying Chemistry to Society (4th Edition), by Stanitski, Eubanks, Middlecamp and Pienta (American Chemical Society, McGraw-Hill, 2003). Make sure you have the 4th edition, as it has been substantially revised from previous editions. There is also a Laboratory Manual. Both texts are available in the NYU Bookstore.

III. Lectures and Laboratories

The lectures are Tuesday and Thursday, 11:00 AM – 12:15 PM, in Room 207, Silver Center. A tentative lecture schedule appears later in this syllabus. All students in this course are required to register for one of the laboratory sections, which meet on Friday and Monday. You cannot receive credit for this course without taking the laboratory. Laboratories are held in room 455 Brown, and will begin on Friday, Sept. 17 (No labs Friday, Sept. 10 or Monday, Sept. 13).

IV. Communication

An NYU Blackboard page, which can be accessed through your home.nyu.edu page (click on "Academics"), will be set up shortly after the beginning of the semester. Check this page frequently for announcements and other course materials. You will receive information via your NYU e-mail address once it has been set up.

V. Attendance

Attendance will not be taken in lecture, but it is of course to your benefit to attend and find out what is going on in the course. Attendance is *required* in laboratory. There are no make-ups for the laboratory experiments or laboratory quizzes. If you miss a lab period because of illness you must present a doctor's note to your lab instructor explaining your absence. If you do not, you will receive a grade of zero for the laboratory work on that day. If you intend to miss a lab because of a religious holiday, you should inform your instructor in advance. In the case of excused absences, your grade for the laboratory will be based on the remaining laboratories that you did perform. However, if you miss four or more lab assignments for whatever reason, you will receive a grade of zero for the laboratory part of this course.

VI. Homework

Approximately ten homework problems will be assigned in lecture each week. They are to be handed in at the beginning of your laboratory period the following week. An unannounced selection of problems from the homework will be graded. Each homework assignment will be worth 10 points. Late assignments must be placed in the mailbox outside of Room 202 Main. Late homework will be downgraded 3 points per day late. A list of homework problems is given at the end of this syllabus. Please note that even if you miss a laboratory session due to a documented absence (see V, above) you are still required to complete the homework assignment. Contact your laboratory instructor to arrange a suitable deadline for submitting the work.

VII. Teaching Assistants

The teaching assistants for this course are: Azaria Eisenberg (ase217@nyu.edu), Aiming Gao (ag746@nyu.edu) and Nahum Shiffeldrim (ns706@nyu.edu) and They are all experienced graduate students in the Department of Chemistry. They will lead you through your laboratory sessions and will also give occasional problem sessions (to be announced) and review sessions for the midterm and final examinations.

VIII. Basis of the Final Grade

The course will be graded on the basis of a single midterm (see schedule), a final, homework, lab quizzes, and laboratory work. The quizzes are given during the first ten minutes of the laboratory period, so be on time. The quizzes will be based on the procedure and basic theory for the laboratory assignment for that day, and are given to ensure that you read the assignment ahead of time and know what is to be done in lab on that day. The midterm and final examinations will be based on text, lecture and laboratory material. The percentage breakdown is as follows:

Midterm Examination	30%
Final Examination	30%
Homework	10%
Laboratory Work	30%

Each laboratory exercise is worth 50 points and the breakdown is as follows:

Attendance	10 points
Quiz	10 points
Lab Assignment	30 points

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Lecture and Laboratory Schedule

Date	Chapter	Title	Laboratory Assignments
Sept. 7		Introduction	
Sept. 9	1	The Air We Breathe	
Sept. 10/13			<i>No Lab</i>
Sept. 14	1		
Sept. 16	1		
Sept. 17/20			<i>Lab 1: Properties of Air</i>
Sept. 21	2	Protecting the Ozone Layer	
Sept. 23	2		
Sept. 24/27			<i>Lab 2: Properties of Light</i>
Sept. 28	2		
Sept. 30	3	The Chemistry of Global Warming	
Oct. 1/4			<i>Lab 3: Spectroscopy</i>
Oct. 5	3		
Oct. 7	3		
Oct. 8/11			<i>Lab 4: Molecular Models</i>
Oct. 12	3		
Oct. 14	4	Energy, Chemistry and Society	
Oct. 15/18			<i>Lab 5: Heat of Reaction</i>
Oct. 19	4		
Oct. 21	4		
Oct. 22/25			<i>Review for Midterm</i>
Oct. 26	5	The Water We Drink	
Oct. 28		Midterm Examination	
Oct. 29/ Nov. 1			<i>Lab 6: Aqueous Ion Reactions</i>
Nov. 2	5	The Water We Drink (cont.)	
Nov. 4	5		
Nov. 5/8			<i>Lab 7: Water Hardness</i>
Nov. 9	6	Neutralizing the Threat of Acid Rain	
Nov. 11	6		
Nov. 12/15			<i>Lab 8: Acid Rain</i>
Nov. 16	6		

Lecture and Laboratory Schedule (continued)

Nov. 18	8	Energy from Electron Transfer
<i>Nov. 19/22</i>		<i>Lab 9: Building Batteries</i>
Nov. 23	8	
Nov. 30	8	
Dec. 2	7	The Fires of Nuclear Fission
<i>Dec. 3/6</i>		<i>Lab 10: Photovoltaics</i>
Dec. 7	7	
Dec. 9	7	
<i>Dec. 10/13</i>		<i>Review for Final Exam</i>
Dec. 14		Review
Dec. 21		Final Examination (10:00 – 11:50)

A list of representative homework problems is given below. The weekly assignments will most likely be drawn from this list, although supplementary problems may also be included.

Chapter	Homework
1	1, 4, 5, 7, 9, 14-19, 21, 36, 37
2	2, 3, 7, 8, 10-15, 18, 20, 28, 30, 37, 44
3	1, 2, 4, 6, 9-15, 18, 20, 21, 22, 25, 28, 32
4	2, 3, 4, 6, 9, 12, 14, 18, 19, 22, 24, 29, 42, 43, 47
5	2, 4, 5, 8, 9, 11, 12, 13, 15, 17, 18-24, 31
6	1, 3, 6, 7, 8, 9, 14, 15, 16, 19, 21, 30, 31, 36, 40, 43
8	1-3, 6, 7, 12, 22-25, 33-36
7	4, 9, 10, 12, 14, 22, 23, 24, 26, 31, 32

All problems are from the text: Chemistry in Context: Applying Chemistry to Society, 4th Edition, by Stanitski, Eubanks, Middlecamp, and Pienta (American Chemical Society, McGraw-Hill, 2003)