CORE UA 203: ENERGY & THE ENVIRONMENT

Fall 2018

T/Th 12:30 P-1:45 P

Room: SILVER 207

Instructor: Prof. Lara K. Mahal **Office:** Silver 823, Biomedical Chemistry Institute
E-mail: **NYU Classes **Phone:** 212-998-3533

** All class-related email is to be sent through the **NYU Classes** system using the internal messaging function. This email is monitored by myself and by the teaching staff on a regular basis. If you feel that you need a response from me specifically, please put ATTN: PROF in the header of your NYU classes email. *Please allow a full business day (24 h, longer over weekends) for a response*. If there is an emergency, please put EMERGENCY in the title of the email and I will respond as soon as possible. All emails sent to NYU Classes come to my regular mailbox but are marked as class business. *This system is in place to ensure that your emails do not get lost in my other correspondence, so please follow it.*

Course Description: Welcome to the Energy and the Environment Core Course. This course explores the scientific foundations of current energy and environmental issues and their implications for public policy. Subjects range from an exploration of air pollution to global warming, to water pollution and the science behind energy policy. The laboratory experiments are closely integrated with the lecture and provide hands-on explorations of central course themes. Throughout the course we will examine how scientific studies of the environment are intimately connected with political, economic and policy concerns. By the end of this course, it is hoped that you will have a grasp of the scientific method and be scientifically literate enough to interpret science in the popular media.

Professor Mahal's Office Hours: **Thursdays 2:30p-3:30p and Fridays 1:30p-2:30p.** Office Hours begin this Thursday (9/6), however there are no office hours this Friday (9/7). Friday office hours start next week (9/14). **Thursday office hours will be held in the Silver 7 Conference Room** (Take Silver elevator to 7th floor, it is right outside elevator)**. Friday** office hours will be held in **the Chemistry Department Office Hour Room B (Silver 1002)**, located on the 10th floor of the Silver Building adjacent to the lecture hall 1003. *My office hours are an excellent place to ask me questions on the course material and to get some extra help in a friendly environment. All are welcome, especially those who are struggling with the material. It is always better in such cases to* ***get help early****, rather than late.*

Teaching Staff/Laboratory Instructors: The course is staffed by four talented, dedicated graduate students. They are a valuable resource for learning the course material. Instructors will be available during scheduled office hours in the communal office hour suite located in Silver 1002 (near the Department of Chemistry office suite). **All email correspondence with the course instructors is to go through NYU Classes.**

Gordy Brown	
Lab Section: 011	W 9:00 AM-10:40AM
Lab Section: 012	W 11:00AM-12:40PM
Office hour:	***Thursday 5:00 - 7:00 PM Teaching Suite Silver 1002 A.***
Shiyu Chen	
Lab Section: 013	W 1:00PM-2:40 PM
Lab Section: 014	W 3:00PM-4:40PM
Office hour:	***Tuesday 2:00-4:00 PM, Teaching Suite Silver 1002 A***
Fangyuan Dong	
Lab Section: 016	Th 9:00AM-10:40AM
Office hour:	***Tuesday 10:00 -11:00AM, Teaching Suite Silver 1002A***
Ru Deng	
Lab Section: 015	W 5:00PM-6:40PM
Office hours:	***Wednesday 1:00 – 2:00 PM Teaching Suite Silver 1002 B***

LABORATORIES AND OFFICE HOURS START NEXT WEEK

Attendance: Attendance at both lectures and laboratories is **mandatory** for your success in this class. ***The tests will be based on the lecture notes (i.e. the material covered in the posted slides), printed materials and on the book.*** If you do not attend the lectures and laboratories, your chances of passing this class with a decent grade *will decrease precipitously*.

NYU Classes: We will be using NYU Classes as our course website. **The course site is a *critical* place to go for information.** It is also the appropriate mechanism for sending email to myself or to the teaching staff. Note all email through NYU Classes gets forwarded to our individual email accounts if sent to us. Thus, we will receive it. NYU Classes will contain useful items such as a posting of this syllabus, Quizzes, Homework Assignments, extra reading and the posted lecture slides. *You will need access to a computer and printer for this class*.

Slides: I will post slides from the day's lecture on NYU Classes. These slides will be posted by the morning after class. They are to be used *in conjunction with* the notes that you will presumably take in class. These slides will contain the homework assignment associated with the lecture. All material covered on these slides are fair game for the exams. They will be posted on NYU classes in the Resources Section.

In Lecture Extra Credit: Every lecture, ***starting 9/11/2018***, I will have quick, optional, in class problems on the material covered. For extra credit, students should download and print the standardized lecture practice problem sheet (found on the NYU-Classes site) and try the in class problem. *Work done on plain paper will not be accepted, you must use the worksheet*. At the end of the lecture, deposit the sheet in the box. The teaching staff will check whether or not you have tried the problem. These problems will be returned to you in your laboratories. *If you have attempted the practice problems in a lecture and turned in a minimum of 19 lecture problem sheets (of 23 possible) over the course of the semester, I will add 0.5 grade points of extra credit to your final grade*. If you are close to a grade cutoff, this may mean the difference between an A- and a B+.

Required Texts: There are two textbooks **required** for this class. They are both available at the Bookstore:

1.) *Catherine H. Middlecamp et al., Chemistry in Context: Applying Chemistry to Society, 8th Edition (Boston: McGraw Hill, 2014).* It is important that you obtain the ABRIDGED and CURATED version of the 8th Edition of the textbook, available in the NYU Bookstore, as this version is tailored for this single-semester course (ISBN-10: 1308172257 and ISBN-13: 9781308172255). You have the option to purchase the eBook only or the eBook with the loose-leaf version of the textbook in the bookstore. The CONNECT code version is not necessary because we are not going to use CONNECT.

2.) *Laboratory Manual for Energy and Environment*

Other Required Materials: You are ***required*** purchase safety glasses from the NYU bookstore. Many of the laboratory sessions require you to use chemicals that are potentially damaging to your eyes, so SAFETY GLASSES ARE ABSOLUTELY REQUIRED DURING THESE LABS. If you do not bring your safety glasses when required, you will not be permitted to perform the lab experiment and will not receive credit for that week's lab. Please ask for "safety glasses" at the bookstore and not "safety goggles," which are used for majors-level Chemistry Department courses.

Homework: Homework problems from Middlecamp et al and additional questions will be assigned after every lecture but not collected. *It is important to do this homework*. The homework will help you to keep up in the class and ensure your understanding of the material. Aspects of the exams will be directly drawn from the homework material. If you do not understand this material, you will find yourselves unable to pass the exams.

Quizzes: *There will be a **weekly** **online** quiz that will be administered through NYU Classes, starting next week (9/12/2018). The quiz will be posted on Wednesday and due by 12p Thursday.* Once the quiz is activated, it must be finished at that sitting. All quizzes will count towards your grade. Taken together, the quizzes will count for ***10%*** of your final grade. **The quizzes are to be done as individual work.** They are open book, open note but not open person.

Exams: There are **two** in class midterm exams. Please note the dates NOW. **All will count toward the final grade**. The midterms will be held on the following class days:

Tuesday, October 16 in class
Tuesday, November 20 in class.

All together the midterms will count for ***30%*** of your total course grade. If you are ill on an exam day, you must notify Professor Mahal prior to the start of the exam and must present Prof. Mahal with a verifiable note from a physician. In such a case where **a single** midterm is missed, the final exam will count for 45% of the grade. Unexcused failure to take the midterm exams will result in an automatic zero recorded for the exam. If more than one midterm is missed and there is a justifiable excuse, an incomplete will be given in the class and must be made up within the following year.

Final Exam: The **Final Exam** will count for ***30%*** of your grade and will be comprehensive (i.e. anything taught in class during the semester is fair game). ***Failure to take the Final EXAM at the scheduled time and place without a documented and approved excuse will result in an automatic F being assigned.***

The final exam is currently scheduled for **Thursday 12/20 12:00-1:50pm.** The location will be announced. *You are responsible for confirming the final exam date, time and location*

Disabilities New York University provides accommodations for qualified students with disabilities. To ensure that the most appropriate accommodations are provided, students should contact the Moses Center for Students with Disabilities (212-998-4980). *Special needs for the lecture should be brought to attention of the instructor by no later than Sept 13, 2018.* If accommodations are needed, students must register with CSD (*see* http://www.nyu.edu/students/communities-and-groups/students-with-disabilities/how-to-register.html for more information). If you wait until the exam date or close to it to register with CSD, we may be unable to provide appropriate accommodations.

EXAM Regrade Policy: Any questions on the grading of an exam must be submitted to Professor Mahal within *5 business days* of the graded exam's return. The entire exam will then be regraded by Professor Mahal. A higher or lower score may result. To submit a regrade: 1) Do not make additional marks on the exam. 2) On a separate, signed cover sheet stapled to the exam list your email address, state the problems that were misgraded and affirm that no changes were made to the exam post-grading. Place the exam in Professor Mahal's mailbox (submit to Chemistry Department Office for her mailbox) or during her office hours. *Oral or late requests for regrades will not be accepted.*

LABORATORY:

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, you will be required to **drop the course.** The laboratory sessions will be held in **Silver 202** and will begin on September **12 & 13**.

Lab Section	*Day and Time*	*Instructor*
Section 011	Wednesday, 9:00 a.m. – 10:40 p.m.	Gordy Brown
Section 012	Wednesday, 11:00 a.m. – 12:40 p.m.	Gordy Brown
Section 013	Wednesday, 1:00 p.m. – 2:40 p.m.	Shiyu Chen
Section 014	Wednesday, 3:00 p.m. – 4:40 p.m.	Shiyu Chen
Section 015	Wednesady, 5:00 p.m. – 6:40 p.m.	Ru Deng
Section 007	Thursday, 9:00 a.m. – 10:40 p.m.	Fangyuan Dong

Each weekly lab project is worth 50 points:

Attendance	**10 points**
Quiz	**10 points**
Lab Assignment	**30 points**

Attendance Credit: You are expected to arrive punctually for the beginning of the lab session. 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 partner. Some laboratories may have a take-home component in addition to the in-lab exercises.

Lab Absence Policies

You are strongly advised to avoid missing **any** of the lab sessions. In the event, however, that you cannot attend a lab session because of serious illness, **you must complete the LAB ABSENCE FORM (posted on the course site) and submit it to Professor Mahal and your lab instructor within ONE WEEK of the missed lab.** All absences because of illness must be **accompanied by a doctor's note**.

If you cannot attend a lab session because of a religious observance, **you must complete the LAB ABSENCE FORM (posted on NYU Classes/Resources/Course organization folder) and submit it to Professor Mahal and your lab instructor within ONE WEEK of the missed lab.** It is also good manners to e-mail your lab instructor through NYU Classes to inform him/her of your absence.

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 Mahal and your lab instructor in advance. Please be mindful that attending another lab section under such circumstances may be impossible owing to the aforementioned limit of 20 students per lab section.

GRADING POLICY:

The **final course grade** will be calculated as follows:

First Midterm:	15%
Second Midterm:	15%
Online Quizzes	15%
Final Exam:	30%
Laboratory	25%
Total	100%

The final grades will assigned based on the following:

88.0-100% A-/A/A+

78.0-88.0% B-/B/B+

65.0-78% C-/C/C+

55.0-65.0% D

<55% F

The instructor reserves the right to adjust grades as deemed appropriate. Please note: grades will not go down (i.e. you won't get a lower grade than indicated by the above general cutoffs) but may be adjusted upward. *Note:* There are no preset number of A's and B's, i.e. there is no curve. The grade you receive is based on your work, not what your friend got or how it compares to your classmates. If everyone earns an A, then everyone will get an A. If everyone earns an F, you will all get Fs.

Academic Integrity: I expect each of you to conduct yourselves honorably. Students who violate the University rules on scholastic dishonesty (by, for example, working together on the Quizzes) or cheating on exams are subject to disciplinary penalties including the possibility of failure in the course and dismissal from the University. It is just wrong and you should know better, so don't do it. I can, have and will report those who fail to follow the standards of academic integrity to the Dean's office for further disciplinary action.

Lecture (*tentative*) and Laboratory Schedule

	Date	*Lecture Topic*	*Reading*	*Laboratory Project*
1	Tue Sep 4	Course Introduction		
		THE AIR WE BREATHE		
2	Th Sep 6	The Air We Breathe	Ch.1, pp. 22 – 36	
3	Tu Sep 11	Chemical Principles	Ch.1, pp. 36 – 45	
	Wed Sep 12			*Online Quiz 1*
	Sep 12&13			*Lab 1: Math Review*
4	Th Sep 13	Air Pollution – Science and Policy	Ch.1, pp. 45 – 62	
		THE OZONE LAYER		
5	Tu Sep 18	Atomic Structure	Ch. 2, pp. 70 – 77	
	Wed Sep 19			*Online Quiz 2*
	Sep 19&20			*Lab 2: Properties of Air*
6	Th Sep 20	Molecules and Lewis Structure	Ch. 2, pp. 77 – 81	
7	Tue Sep 25	Light and The Ozone Layer	Ch. 2, pp. 81 – 91	
	Wed Sep 26			*Online Quiz 3*
	Sep 26&27			*Lab 3: Properties of Light*
8	Th Sep 27	Ozone Depletion – Science and Policy	Ch. 2, pp. 91 – 107	
		CLIMATE CHANGE		
9	Tue Oct 2	Earth's Climate	Ch.3, pp. 112 – 122	
	Wed Oct 3			*Online Quiz 4*
	Oct 3&4			*Lab 4: Sunscreens*
10	Th Oct 4	Greenhouse Gases	Ch. 3, pp. 122 – 129	Greenhouse Gases
	Tue Oct 9	No class- Fall recess		
	Wed Oct 10			*Online Quiz 5*
	Oct 10&11			*Midterm 1 Review*
11	Th Oct 11	Carbon Emissions and Carbon Footprint (I)	Ch. 3, pp. 129 – 153	
	TUE Oct 16	**Midterm 1 (~Ch. 1-2)**		
	Oct 17&18			*Lab 5: Molecular Vibrations*
12	Tue Oct 23	Carbon Emissions and Carbon Footprint (II)		
	Wed Oct 24			*Online Quiz 6*
		ENERGY FROM COMBUSTION		
	Oct 24&25			*Lab 6: Chemical*

				Reactions
13	Th Oct 25	What is Energy?	Ch. 4, pp. 160 – 177	
14	Tue Oct 30	Energy from Combustion & Biofuels	Ch. 4, pp. 177 – 201	
	Wed Oct 31			*Online Quiz 7*
		WATER FOR LIFE		
15	Th Nov 1	Water and Ions	Ch. 5, pp. 208 – 214	
	Oct 31 &Nov 1			*Lab 7: Aqueous ions*
16	Tue Nov 6	Measuring Concentration	Ch. 5, pp. 222 – 233	
	Wed Nov 7			*Online Quiz 8*
	Nov 7&8			*Lab 8: Hard Water*
17	Th Nov 8	Water Quality – Science and Policy	Ch. 5, pp. 214 – 222, 233 – 247	
		THE FIRES OF NUCLEAR FISSION		
18	Tue Nov 13	Nuclear Energy	Ch. 7, pp. 252-268	
	Wed Nov 14			*Online Quiz 9*
	Nov 14&15			*Midterm 2 Review*
19	Th Nov 15	Nuclear Energy	Ch. 7, pp. 268-293	
	Tue Nov 20	**Midterm 2 (~Ch. 3-5)**		
	Th Nov 22	No class-Thanksgiving		
		ENERGY FROM ELECTRON TRANSFER		
20	Tue Nov 27	Electron Transfer Reactions	Ch. 8, pp. 300 – 313	
	Wed Nov 28			*Online Quiz 10*
	Nov 28&29			*Lab 9: Building Batteries*
21	Th Nov 29	Fuel Cells and Electrolytic cells	Ch. 8, pp. 314 – 322	
22	Tue Dec 4	Solar Cells	Ch. 8, pp. 322 – 329	
	Wed Dec 5			*Online Quiz 11*
	Dec 5&6			*Lab 10: Solar Cells*
23	Th Dec 6	Solar Energy - Science and Policy	Ch. 8, pp. 330 – 333	
24	Tue Dec 11	TBD		
	Wed Dec 12			*Online Quiz 12*
	Dec 12&13			*Final Exam Review*
25	Th Dec 13	TBD		
	Dec. 20	**Final Exam**	**Ch. 1—7 &8**	*12PM-1:50PM*