



North South University
Department of Civil and Environmental Engineering
CEE 209: Environmental Chemistry
Spring 2018

Instructor: Dr. Shama E. Haque
Assistant Professor, Department of Civil and Environmental Engineering

Room: SAC 730

Email: shama.haque@northsouth.edu (“CEE 209” in the subject line)

Note that email sent to my personal account will NOT be replied to.

DO NOT call on my personal cell phone.

Office Hours: ST: 10:00 am – 11:00 am; 2:30 pm – 3:00 pm
MW 10:00 am – 11:00 am; 2:30 pm – 3:00 pm
or by email appointment

Class Times: **SEC 1 LECTURE MEETS MW 11:10 am - 12:35 pm; Rm. SAC 304**
SEC 2 LECTURE MEETS MW 12:45 pm - 02:10 pm; Rm. SAC 305

Course Description: Chemical compositions and reactions in the atmosphere, hydro-sphere and lithosphere. Impact and biochemical effects of toxic chemicals on the environment. Sampling and monitoring of pollutants in air, water and land. Instrumental techniques in environmental chemical analysis.

Pre-requisite: CHE 120 / CHE 101. 3 credits.

Course Objective: The objectives of this course are:

1. To understand fundamental knowledge of environmental chemistry.
2. To understand and use chemical concepts to analyze chemical processes involved in different environmental problems (air, water, soil).
3. To introduce complex environmental chemistry problems, which are stemming from natural and man-made sources and their impact on human health and society at global and national levels

Student Outcomes (COs): Upon successful completion of this course, students will be able to:

- CO1: apply basic knowledge and concepts of the sources, reactions, transport, effects, and fates of chemical species in the Earth’s systems and biogeochemical effects of chemicals on the environment
- CO2: assess chemical processes in different environmental compartments of air, water, land and biota by using the basic understanding of environmental chemistry.
- CO3: analyze local, national and global environmental problems based on the knowledge gained throughout the course



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Mapping of CO-PO

| Sl. | CO Description | Program Outcome | Bloom's taxonomy domain/level (C: Cognitive P: Psychomotor A: Affective) | Delivery methods and activities | Assessment tools |
|-----|---|-----------------|---|---------------------------------|------------------|
| CO1 | apply basic knowledge and concepts of the sources, reactions, transport, effects, and fates of chemical species in the Earth's systems and biogeochemical effects of chemicals on the environment | PO 1 | C2 | Lectures, Group Discussions | Midterm Exam |
| CO2 | assess chemical processes in different environmental compartments of air, water, land and biota by using the basic understanding of environmental chemistry. | PO 2 | C4 | Lectures, Group Discussions | Midterm Exam |
| CO3 | analyze local, national and global environmental problems based on the knowledge gained throughout the course | PO 13 | C5 | Lectures, Group Discussions | Final Exam |

Course Materials:

Text Book:

- A. J.E. Andrews, P. Brimblecombe, T.D. Jickells, P.S. Liss and B. Reid (2004). An Introduction to Environmental Chemistry. 2nd edition, Blackwell Publishing, MA, USA.
- B. Manahan, Stanley E. "Environmental science, technology, and chemistry" (2000). Environmental Chemistry, Boca Raton: CRC Press LLC. Boca Raton, USA.

Additional Reading Material:

De., A.K. (2014) Environmental Chemistry. 7th edition, New Age International Ltd., Publishers.

R.M. Harrison (Ed.; 1999), Understanding Our Environment. An Introduction to Environmental Chemistry and Pollution. 3rd Edition, The Royal Society of Chemistry, Cambridge, UK.

Lecture Note: Provided in the RESOURCE.



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Other: Pen (black ink), pencil, eraser, calculator, ruler.

Grading Policy:

Lecture

| | | |
|-----------------|-----|------------|
| Attendance | 5% | |
| Presentation | 10% | |
| 2 Midterm Exams | 50% | (25% each) |
| Final Exam | 35% | |

Exam Policy:

Both midterm exams will be comprehensive, drawing upon any course materials up to the date of the exam. The instructor will inform the students of the final exam syllabus well ahead of time. In order to prepare for the exams, the lecture notes should be thoroughly reviewed. **A missed exam and presentation will not be rescheduled for any reasons.** If due to unavoidable circumstances, a missed exam needs to be rescheduled, prior notice will be given.

Lectures:

The lecture is where you get an overview of the course material, and find out what is important to know. Most of your grade is derived directly from the lectures. Some concepts covered in the lecture are not in the text! Any changes to the schedule or to assigned work will be announced in the lecture.

Attendance:

Attendance is important because even if you come to the lecture barely awake, something will sink into your brain and you will take some knowledge home! In the event that you miss a lecture, find out what you have missed from a buddy, and pick up any missed assignments. If you are absent for 3 consecutive lectures without notification then you will be assigned a failing grade in the course. **There are no makeup presentation or exam.**

To get attendance grade you MUST attend the section you are officially registered in.

Work Submission:

Presentation reports must be submitted in hard copy at the beginning of class on time on the prescribed date; electronic versions will NOT be accepted. NO LATE SUBMISSION WILL BE ACCEPTED.

Study Process:

More study = higher grades! Don't try to "cram" just before the exam, as there will be too much to read and learn!



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Responsibilities:

1. Instructors:

- organize relevant lectures;
- guidance for studying and doing assignments, writing exams;
- timely and impartial feedback, and consultation time.

2. Student:

- attend lectures and take part in discussions;
- learn by using many resources: text, lectures, discussions, etc;
- maintain academic honesty;
- maintain discipline, conduct in a professional and respectful manner;
- **responsible for regularly checking their email and notices posted outside the CEE Dept Office and the CEE 209 NOTICE subfolder in Resource.**
- **turn off cell phone before coming to a class or exams.**

Academic Dishonesty:

There are two types of behavior that are considered academically dishonest. Plagiarism is the deliberate formal presentation or submission of the research, words, ideas, illustrations or diagrams of others as one's own without citation or credit. Cheating is the use of unauthorized aids (including electronic devices), assistance or materials in the preparation of assignments or in examinations. Note that electronic devices are not allowed in the exam hall. Copying or showing your work to others, or asking for answers is also considered cheating. Penalties for cheating or plagiarism include one or more of the following: a zero grade on an assignment or exam, a failing grade in the course, suspension from the college, and expulsion from the college.

Code of Conduct: On the premises of the University or at a University-sponsored program, students must abide by the Student Code of Conduct: <http://www.northsouth.edu/student-code-of-conduct.html>

Course Topics:

- Introduction to environmental chemistry
- Environmental chemist's toolbox
- The atmosphere
- The chemistry of continental solids
- The chemistry of continental waters
- The oceans
- Global change



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Tentative lecture Schedule:

* One Day = 1.5 lecture hours, Total 24 days lecture = 36 lecture hours

| Day* | Outcome/ Material Covered | Reference Reading | Activity |
|---|---|-------------------|-------------------------------------|
| Day-1 | Course overview | - | Lecture and Group Discussion |
| Day-2 | Introduction to environmental chemistry | A-1 B-1 | Lecture and Group Discussion |
| Day-3 | Introduction to environmental chemistry, Critical Thinking Exercise | A-1, B-2 | Lecture and Group Discussion |
| Day-4 | Environmental chemist's toolbox | A-2 | Lecture and Group Discussion |
| Day-5 | Environmental chemist's toolbox | A-2 | Lecture and Group Discussion |
| Day-6 | The atmosphere | A-3 B-9, 10 | Lecture, video, Group Discussion |
| Day-7 | The atmosphere | A-3, B-9 | Lecture and Group Discussion |
| Day-8 | Midterm Exam Review - 1 | | Lecture Overview, Group Discussion |
| Day-9 | Midterm Exam 1 | | |
| Day-10 | The chemistry of continental solids | A-4 | Lecture, video and Group Discussion |
| Day-11 | The chemistry of continental solids, Critical Thinking Exercise | A-4, B-5 | Lecture and Group Discussion |
| Day-12 | The chemistry of continental solids | A-4, B-15 | Lecture and Group Discussion |
| Day-13 | Student presentations | | Oral Presentation (Power Point) |
| Day-14 | Student presentations | | Oral Presentation (Power Point) |
| Day-15 | The chemistry of continental waters, Critical Thinking Exercise | A-5, B-3, 4 | Lecture, video and Group Discussion |
| Day-16 | The chemistry of continental waters | A-5, B-3, 4 | Lecture and Group Discussion |
| Day-17 | The chemistry of continental waters, Critical Thinking Exercise | A-5, B-6, 7 | Lecture and Group Discussion |
| Day-18 | Midterm Exam Review - 2 | | Lecture Overview |
| Day-19 | Midterm Exam 2 | | |
| Day-20 | The oceans | A-6 | Lecture, video |
| Day-21 | The oceans | A-6 | Lecture and Group Discussion |
| Day-22 | Global Change | A-7 | Lecture and Group Discussion |
| Day-23 | Global change, Critical Thinking Exercise | A-7 | Lecture and Group Discussion |
| Day-24 | Final Exam Review | | Lecture Overview |
| Final Exam (As per schedule declared by NSU) | | | |