

## EVSC 610 - Environmental Chemical Science: Water Chemistry

### *Fall 2025 Course Syllabus*

**NJIT Academic Integrity Code:** All Students should be aware that the Department of Chemistry & Environmental Science (CES) takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

### COURSE INFORMATION

**Course Description:** This course will cover environmental water chemistry, focusing on acid-base and metal-ligand equilibria, oxidation-reduction reactions, and chemical reaction kinetics and thermodynamics. There is some emphasis on equilibria governing inter-phase (gas-liquid, solid-liquid) chemical distribution.

#### Course Objectives and Student Learning Outcomes:

**Learning Outcomes:** By the end of this course,

- 1) Students will understand with the equilibrium reactions in close and open systems, the interaction between different phases (liquid, gas and solid), and the redox reactions in environmental water systems.
- 2) Students will learn to predict the chemical composition, pH and redox condition of an aquatic system.
- 3) Students will develop the tools to solve problems with complex chemical reactions in natural and engineer systems

**Number of Credits:** 3

**Course-Section and Instructors**

Course-Section	Time	Location	Instructor
EVSC 610-101	R 6 pm – 8:50 pm	TIER 113	Lijie Zhang

**Office Hours:** R 5-6 pm

**Required Textbook:**

<b>Title</b>	Water Chemistry
<b>Author</b>	Mark M. Benjamin
<b>Edition</b>	2 <sup>nd</sup>
<b>Publisher</b>	Waveland Press, Inc
<b>ISBN#</b>	978-1-4786-2308-3

**Canvas:** There is a course Canvas site that will include significant resources and updates of importance to this course. Please check it frequently, and also make sure to check or forward your NJIT email in order to receive important announcements.

**Grading Policy:** The final grade in this course will be determined as follows:

<b>In-class participation</b>	5%
<b>Homework</b>	20%
<b>Quizzes</b>	10%
<b>Class project</b>	15%
<b>Midterm Exam</b>	25%
<b>Final Exam</b>	25%

Your final letter grade in this course will be based on the following tentative curve:

<b>A</b>	90+	<b>C</b>	70+
<b>B+</b>	85+	<b>D</b>	60+
<b>B</b>	80+	<b>F</b>	
<b>C+</b>	75+		

**Attendance:** Attendance is mandatory. Students who miss class due to a valid personal or medical reason must contact the Dean of Students office with the valid excuse and get the excuse approved. The Dean of Students will then contact me and any other professors whose classes were missed. Missed worksheets, quizzes, or exams without a Dean of Students approved excuse will result in a zero grade. The instructor does not approve excuses of any sort. Students walking out of class early or low attendance early in a class may result in a roll call being taken and loss of points. When you miss a class, it will be your responsibility to find out what was discussed.

**Homework:** Homework assignments must be completed and submitted on the date specified by the instructor.

**Exams:** Exams are **open-book** and **open-note**. There will be one midterm exam and one comprehensive final exam. The final exam will test your knowledge of all the course material taught in the entire course. Normally **NO MAKE-UP EXAMS** are allowed during the semester. In the event that a student has a legitimate reason for missing an exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the CES Department Office/Instructor prior to the exam that the exam will be missed so that appropriate steps can be taken to make up the grade.

**Class Project:** There will be a team project. Students are encouraged to consult with the instructor about the topic. Students will form groups, each with their own focus. Each group will formulate question(s) and then work to address those questions with support from peer-review articles. The findings will be summarized as a term paper (font 12, 1.15× spaced, at least 5 pages in length excluding figures and references), and inclusion of figures and tables is recommended to facilitate the delineation. Each group will prepare a presentation of the findings. Please plan your talk for about 15 minutes, leaving 5 minutes for questions and discussions. Both paper and presentation are weighed equally for grading. It is suggested to delegate one student to guide the entire project.

## ADDITIONAL RESOURCES

**Accommodation of Disabilities:** Office of Accessibility Resources and Services (*formerly known as Disability Support Services*) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you need accommodations due to a disability please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at [973-596-5417](tel:973-596-5417) or via email at [lyles@njit.edu](mailto:lyles@njit.edu). The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at:

<http://www5.njit.edu/studentsuccess/disability-support-services/>

**Important Dates** (See <https://www.njit.edu/registrar/fall-2023-academic-calendar>)

<b>Date</b>	<b>Event</b>
September 1	Labor Day. University Closed.
September 2	First Day of Classes
September 8	Last Day to Add/Drop a Class Last Day for 100% Refund, Full or Partial Withdrawal
September 9	W Grades Posted for Course Withdrawals
September 15	Last Day for 90% Refund, Full or Partial Withdrawal No Refund for Partial Withdrawal after this date
September 29	Last Day for 50% Refund, Full Withdrawal
October 20	Last Day for 25% Refund, Full Withdrawal
<b>November 10</b>	<b>Last Day to Withdraw</b>
<b>November 25</b>	<b>Thursday Classes Meet</b>
November 26	Friday Classes Meet
November 27	Thanksgiving Recess Begins
November 30	Thanksgiving Recess Ends
December 11	Last Day of Classes
December 12	Reading Day
December 13	Saturday Classes Meet
December 14	Final Exams Begin
December 20	Final Exams End
<b>December 22</b>	<b>Final Grades Due</b>

## Tentative Course Outline

Week	Date	Topic	Readings
1	Sep. 4	Introduction, general chemistry concepts, chemical reactivity	Chapter 1 Chapter 2
2	Sep. 11	Reaction Kinetics, Reaction thermodynamic and equilibrium <i>(Class project group formed)</i>	Chapter 3 Chapter 4
3	Sep. 18	Introduction to acid-base chemistry	Chapter 5
4	Sep. 25	Graphical solutions for acid-base chemistry <i>(Term project Title and Questions due)</i>	Chapter 6
5	Oct. 2	Chemical equilibrium software Titrations and buffers	Chapter 7 Chapter 8
6	Oct. 9	Titrations and buffers	Chapter 8
7	Oct. 16	Review session	
8	Oct. 23	<b>Midterm Exam</b>	
9	Oct. 30	Gas-liquid equilibrium	Chapter 9
10	Nov. 6	Chemistry of metals in aqueous solutions: solution phase reactions, Precipitation and dissolution reactions	Chapter 10 Chapter 11
11	Nov. 13	Redox chemistry 1 <i>(Term paper first draft due)</i>	Chapter 12
12	Nov. 20	Redox chemistry 2	Chapter 12
13	Nov. 25	Student presentations <i>(Term paper due)</i>	
14	Dec. 4	Review session	
15	TBA	<b>Final Exam</b>	