NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

EVSC 610: Environmental Chemical Science-Water

Fall 2024 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

Section	Location	Instructor
R 6 pm – 8:50 pm	GITC 2315A	Lijie Zhang

Office Hours: Monday 5-6 pm.

Required Textbook:

Title	Water Chemistry
Author	Mark M. Benjamin
Edition	2nd
Publisher	Waveland Press, Inc
ISBN#	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:

Homework	25
Quizzes	10
Group project	15
Midterm Exam	25
Final Exam	25

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

A	90+	**C**	60+
B+	85+	**D**	50+
B	80+	**F**	<50
C+	70+		

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 Canvas on the date specified by the instructor.

Exams: Exams are **open-book** and **open-note**. There will be a midterm exam and a final exam, and the final exam will only cover materials in the second half semester. 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.

Group Project: 3-4 students will form a group and work together on a term paper. Students are encouraged to consult with the instructor about term paper topic. The term paper needs to be at least 5 pages (font 12, 1.15× spaced) in length excluding figures and references, though inclusion of figures and tables is recommended to facilitate the delineation. For the presentation, please plan your talk for about 15 minutes, leaving 5 minutes for questions and discussions. Both paper and presentation are weighed equally for grading.

ADDITIONAL RESOURCES

Accommodation of Disabilities: **O**ffice of **A**ccessibility **R**esources and **S**ervices (***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 or via email at 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)

Date	Event
September 2	Labor Day. University Closed.
September 3	First Day of Classes
September 9	Last Day to Add/Drop a Class Last Day for 100% Refund, Full or Partial Withdrawal
September 10	W Grades Posted for Course Withdrawals
September 16	Last Day for 90% Refund, Full or Partial Withdrawal No Refund for Partial Withdrawal after this date
September 30	Last Day for 50% Refund, Full Withdrawal
October 21	Last Day for 25% Refund, Full Withdrawal
November 11	**Last Day to Withdraw**
November 26	**Thursday Classes Meet**
November 27	Friday Classes Meet
November 28	Thanksgiving Recess Begins
December 1	Thanksgiving Recess Ends
December 11	Last Day of Classes
December 12	Reading Day 1
December 13	Reading Day 2
December 15	Final Exams Begin
December 21	Final Exams End
December 23	**Final Grades Due**

Tentative Course Outline

Week	Date	Topic	Readings
1	Sep. 5	Introduction, general chemistry concepts, chemical reactivity	Chapter 1 Chapter 2
2	Sep. 12	Reaction Kinetics, Reaction thermodynamic and equilibrium (*Term project group formed*)	Chapter 3 Chapter 4
3	Sep. 19	Introduction to acid-base chemistry	Chapter 5
4	Sep. 26	Graphical solutions for acid-base chemistry (*Term project Title and Objective due*)	Chapter 6
5	Oct. 3	Chemical equilibrium software Titrations and buffers	Chapter 7 Chapter 8
6	Oct. 10	Titrations and buffers	Chapter 8
7	Oct. 17	Review session	
8	Oct. 24	**Midterm Exam**	
9	Oct. 31	Gas-liquid equilibrium	Chapter 9
10	Nov. 7	Chemistry of metals in aqueous solutions: solution phase reactions, Precipitation and dissolution reactions	Chapter 10 Chapter 11
11	Nov. 14	Redox chemistry 1 (*Term paper first draft due*)	Chapter 12
12	Nov. 21	Redox chemistry 2	Chapter 12
13	Nov. 26	Student presentations (*Term paper due*)	
14	Dec. 5	Review session	
15	TBA	**Final Exam**	