

**Chemistry:**  
***Spring 2025 Course Syllabus***  
***CHEM 235-002***

[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:** A continuation of Chem 231. The topics include homogenous and heterogeneous chemical equilibria, ionic equilibria, electrochemistry, kinetic theory of gases, transport phenomena, kinetics, and irreversible processes.

**Number of Credits:** 3

**Prerequisites:** CHEM 231 with a grade of C or better.

### Course-Section and Instructors

Course-Section	Instructor
235-002	Dr. Mieke Peels

**Office Hours:** See Canvas

### Required Textbook:

<b>Title</b>	Physical Chemistry Volume 1
<b>Author</b>	Atkins, de Paula, Keeler
<b>Edition</b>	12th
<b>Publisher</b>	Oxford University Press
<b>ISBN #</b>	9780198851301

**University-wide Withdrawal Date:** The last day to withdraw with a W is Monday, November 13, 2023. It will be strictly enforced.

### Learning Outcomes:

1. Calculate activities and activity coefficients of ions in solutions.
2. Determine equilibrium constants and reaction quotients based on reaction and/or thermodynamic data.
3. Calculate chemical equilibria in simple reactions and predict impact of temperature and pressure.
4. Calculate the transfer parameters (diffusion coefficient, viscosity, thermal and electrical conductivity).
5. Determine the Arrhenius parameters of a chemical reaction from the rate constant vs. temperature data.
6. Analyze data for reactions of simple orders.
7. Build up mechanisms of complex chemical reactions, construct corresponding systems of ordinary differential equations, and use the steady-state or pre-equilibrium approximations.
8. Estimate rate constants of elementary chemical reactions using the Simple Collision Theory and the Transition State Theory.

## POLICIES

All CES students must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforces them strictly.

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

Homework	15%
Participation (Recitations + Post-Exam Reflections)	10%
Quizzes	10%
Midterm Exam I	20%
Midterm Exam II	20%
Final Exam	25%

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

A	90% and higher	C	70% to 74%
B+	85% to 89%	D	60% to 69%
B	80% to 84%	F	59% and lower
C+	75% to 79%		

**Attendance Policy:** Attendance at classes will be recorded and is **mandatory**. Each class is a learning experience that cannot be replicated through simply “getting the notes.”

**Homework Policy:** Homework is an expectation of the course. The homework problems set by the instructor are to be handed in for grading and will be used in the determination of the final letter grade as described above. Homework will be accepted late at a penalty of 10% per day for up to five days after the due date. Late assignments will not be accepted after grades and comments are released.

**Late Penalty Forgiveness Policy:** For students who submit one and only one late homework assignment during the semester, I will remove the late penalty at the end of the course.

**Recitations:** Attendance at recitation is **mandatory**. During this time, problems will be worked through and uploaded to Canvas. Grades will be given for participation and completeness.

**Quizzes:** Quizzes will be given at the start of class, and they will be unannounced. The top five quiz grades will be kept and lower scores will be dropped. At least seven pop quizzes will be given over the course of the semester.

**Exams:** There will be three midterm exams held in class during the semester and one comprehensive final exam. The following exam periods are tentative and therefore possibly subject to change:

Midterm Exam I	2/20
Midterm Exam II	4/10
Final Exam Period	5/10 - 5/16

The final exam will test your knowledge of all the course material taught in the entire course.

**Makeup Exam Policy:** There will normally be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event that a student has a legitimate reason for missing a quiz or 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 that the exam will be missed so that appropriate steps can be taken to make up the grade.

**Cellular Phones:** All cellular phones and other electronic devices must be switched off during all class times. Such devices must be stowed in bags during exams or quizzes.

**Generative AI:** This course expects students to work without artificial intelligence (AI) assistance in order to better develop their skills in this content area. As such, AI usage is not permitted throughout this course under any circumstance.

## **ADDITIONAL RESOURCES**

**Chemistry Tutoring Center:** Located in the Central King Building, Lower Level, Rm. G12. Hours of operation are Monday - Friday 10:00 am - 6:00 pm. For further information please click [here](#).

**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 are in need of 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](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/studentssuccess/disability-support-services/>

**IMPORTANT DATES:** (See [Spring 2025 Academic Calendar](#))

January	20	Monday	Martin Luther King, Jr. Day
January	21	Tuesday	First Day of Classes
January	25	Saturday	Saturday Classes Begin
January	27	Monday	Last Day to Add/Drop a Class
January	27	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
January	28	Tuesday	W Grades Posted for Course Withdrawals
February	3	Monday	Last Day for 90% Refund, Full or Partial Withdrawal, No Refund for Partial Withdrawal after this date
February	17	Monday	Last Day for 50% Refund, Full Withdrawal
March	10	Monday	Last Day for 25% Refund, Full Withdrawal
March	16	Sunday	Spring Recess Begins - No Classes Scheduled - University Open
March	22	Saturday	Spring Recess Ends
April	3	Thursday	Wellness Day - No Classes Scheduled - University Open
April	7	Monday	Last Day to Withdraw
April	18	Friday	Good Friday - No Classes Scheduled - University Closed
April	20	Sunday	Easter Sunday - No Classes Scheduled - University Closed
May	6	Tuesday	Thursday Classes Meet
May	7	Wednesday	Friday Classes Meet
May	7	Wednesday	Last Day of Classes
May	8	Thursday	Reading Day 1
May	9	Friday	Reading Day 2
May	10	Saturday	Final Exams Begin
May	16	Friday	Final Exams End
May	18	Sunday	Final Grades Due
May	19	Monday	Master's and PhD Candidate Commencement - Bloom Wellness and Events Center
May	21	Wednesday	Undergraduate Candidate Commencement - Prudential Center

# Course Outline

Lecture	Date	Topic	Assignment
1	T 1/21	Syllabus, Focus 5F: Activities	See Canvas for HW
2	R 1/23	Focus 6A: The equilibrium constant	
3	T 1/28	Focus 6B: The response of equilibria to the conditions	
4	R 1/30	Redox chemistry review	
5	T 2/4	Focus 6C: Electrochemical cells	
6	R 2/6	Focus 6D: Electrode potentials	
7	T 2/11	Focus 17A: The rates of chemical reactions	
8	R 2/13	Focus 17B: Integrated rate laws	
9	T 2/18	Midterm 1 Review	
10	R 2/20	<b>Midterm Exam 1 (Topics 5F + 6)</b>	
11	T 2/25	Focus 17C: Reactions approaching equilibrium	
12	R 2/27	Focus 17D: Arrhenius equation	
13	T 3/4	Focus 17E: Reaction mechanisms	
14	R 3/6	Focus 17E: Reaction mechanisms	
15	T 3/11	Focus 17F: Examples of reaction mechanisms	
16	R 3/13	Focus 17F: Examples of reaction mechanisms	
<b>Spring Recess (March 17 - March 21)</b>			
17	T 3/25	Focus 17G: Photochemistry	
18	R 3/27	Focus 17G: Photochemistry	
19	T 4/1	Focus 1B: The kinetic model	
<b>Thursday, April 3: Wellness Day, no classes</b>			
20	T 4/8	Midterm 2 Review	
21	R 4/10	<b>Midterm Exam 2 (Topic 17)</b>	
22	T 4/15	Focus 16A: Transport properties of a perfect gas	
23	R 4/17	Focus 16B: Motion in Liquids	
24	T 4/22	Focus 16C: Diffusion	
25	R 4/24	Focus 18A: Collision Theory	
26	T 4/29	Focus 18B: Diffusion-Controlled Reactions	
27	R 5/1	Focus 18C: Transition-State Theory	
28	T 5/6 <b>Thursday schedule)</b>	Final Exam Review	

This syllabus may change based on material covered and other factors.

Updated by Mieke Peels - January 2024  
 Department of Chemistry & Environmental Sciences (CES)  
 Course Syllabus, Spring 2024