NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

CHEM 126 – General Chemistry II

Fall 2025 Course Syllabus

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working to achieve. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: **http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.**

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. ***Any student found in violation of the code by cheating, plagiarizing, or using any online software inappropriately will result in disciplinary action. This may include a failing grade and/or suspension or dismissal from the university.*** *If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu*

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

You are asked to practice extra care and attention in regard to academic honesty, with the understanding that all cases of plagiarism, cheating, multiple submission, and unauthorized collaboration are subject to penalty. You must properly cite and attribute all sources used for papers and assignments. You may not collaborate on exams or assignments, directly or through virtual consultation, unless I give specific permission to do so. Posting an exam, assignment, or answers to them on an online forum (before, during, or after the due date), in addition to consulting posted materials, constitutes a violation of the university's Honesty policy. Likewise, unauthorized use of live assistance websites, including seeking "expert" help for specific questions during an exam, can be construed as a violation of the honesty policy.

COURSE INFORMATION

Course Description: Chem 126 - General Chemistry II. The second semester of a two-semester sequence in chemistry. Introduces the basic concepts of chemistry, including equilibrium, chemical kinetics, thermodynamics, and electrochemistry.
Number of Credits: 3
Pre-requisites: Chem 125
Corequisites: C or higher in Math 110 or equivalent

Course-Section and Instructors

Course-Section	Instructor	Meeting Times		
Chem 126-101	Sean Lee	Wednesday	6:00 PM – 8:50 PM	ECEC 115

Email: sean.lee@njit.edu

Office Hours: Wednesday 5:30 PM – 6:00 PM Electrical and Computer Engineering Center (ECEC) 115 (in person)
Monday 5:30 PM – 6:00 PM Kupfrian Hall (KUPF) 117 (in person)

Webpage: The course website is available through Canvas, which can be accessed via canvas.njit.edu. Please email me immediately if you cannot access the class site. All materials including lecture summaries, PowerPoint slides, and other documents will be posted on the class site. Please check the site frequently for new materials and announcements. All grades for this course will be posted to Canvas on a regular basis. You are responsible for all updates posted to Canvas, and if you find any mistakes in content or grading, or you need help accessing these materials, please contact me as soon as possible.

Required Textbook:

Title	Chemistry: Atoms First 2e
Author	openstax.org
Edition	Second
Publisher	OpenStax
ISBN #	**Color:** ISBN-13: 978-1-947172-64-7 **Black and White:** ISBN-13: 978-1-59399-579-9 **Digital PDF:** ISBN-13: 978-1-947172-63-0

Suggested Material: Free solution manuals can be found using this url: openstax.org

University-wide withdrawal date: The last day to withdraw with a **W** is Monday, November 10th, 2025.

STUDENT RESOURCES FOR SUPPORT AND LEARNING

Chemistry Tutoring Center: Located in the Central King Building, Lower Level, Room G12. You can get help from peer tutors on a "walk-in" basis. There is no private tutoring available, however if the center is not too busy, you may be able to get more personal attention. In this peer tutoring model, tutors are taught to encourage interaction among students to promote learning. In addition, there will be limited tutoring available online as well. *Hours of operation are from Monday—Friday 10:00 am—6:00 pm*, either virtually or in-person.

Accommodation for Accessibility Issues: **O**ffice of **A**ccessibility **R**esources and **S**ervices (**OARS**, *formerly known as Disability Support Services*) offers long term and temporary accommodations for undergraduate, graduate, and visiting students at NJIT. See https://www.njit.edu/studentsuccess/node/5 to learn more about their services.

If you are in need of accommodations due to a documented special needs, please contact the Office of Accessibility Resources and Services 973-596-5417 or via email oars@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 is required to receive accommodations on assignments or exams. Eligible students requiring special conditions for exams must fill out an OARS forms stating the date and time of the exam. It is advisable for eligible students to fill out forms for the two common exams the first week of classes

Please request all exams that must be administered by OARS by the end of the first week of class. If accommodations are not requested in a timely manner, your request will be denied.

Mental Health and Well-being: NJIT is committed to the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Center for Counseling and Psychological Services (c-CAPS) at https://www.njit.edu/counseling/ or by calling the c CAPS office at 973-596-3414. If you need support and information about options and resources, please also reach out to the Office

Learning Outcomes—You should be able to:

1. Define reaction rate, relate reaction rate to stoichiometry, and determine order of a reaction.
2. Describe the factors affecting reaction rate.
3. Use kinetic data to write reasonable reaction mechanisms.
4. Explain equilibrium and equilibrium constants.
5. Understand the difference between the equilibrium constant (K) and the reaction quotient (Q).

6. Determine the direction a reaction will proceed, and the product yield based on the equilibrium constant.
7. Use Le Chatelier's principle to determine direction of reaction.
8. Describe differences in basic crystalline shapes
9. Determine edge length and density of simple crystalline shapes.
10. Predict changes in freezing point, elevation in boiling point and osmotic pressure when a solute dissolves in a pure solvent
11. Understand different definitions of acids and bases.
12. Explain the autoionization of water, the concept of pH, and what determines the strength of acids/bases.
13. Memorize and know how to perform calculations relating to acid and base dissociation constants.
14. Explain what a buffer solution is and understand the importance of buffer solutions.
15. Calculate the efficiency of buffer solutions.
16. Interpret equilibrium constants (Ksp) and discuss solubility of sparingly soluble salts.
17. Interpret titration curves and calculate the pH of a solution during any number of titration points.
18. Understand and explain energy transformations in chemical reactions.
19. Explain entropy, Gibbs free energy, and the second and third laws of thermodynamics.
20. Determine whether a reaction is spontaneous.
21. Calculate the thermodynamic parameters ΔG, ΔS, and ΔH, and understand how the equilibrium constant relates to these parameters.
22. Balance redox reactions and write oxidation and reduction half–reactions.
23. Calculate the cell potential for a redox reaction in a galvanic cell.
24. Relate cell potential to thermodynamic parameters and determine the direction of spontaneity.
25. Use Faraday's law to determine the amount of material deposited during electroplating.
26. Explain electrolysis and overvoltage.
27. Know the difference between chemical reaction and nuclear reaction.
28. Balance nuclear equations and describe the particle emitted during the process.
29. Predict the type of emission from unstable nuclides.
30. Use the mass–energy relationship to calculate the energy released during nuclear processes.
31. Distinguish the difference between nuclear fission and fusion.
32. Describe the applications of nuclear reactions in energy production.
33. Name simple organic compounds and recognize (and name) the basic functional groups.
34. Write reactions of alkanes, alkenes, and alkynes.

POLICIES

You must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforces them strictly. In addition, obtaining course materials such as past exams or solutions to homework and/or class assignments from external sources constitutes as cheating. The official Student's Solutions Guide is exempt. Posting course materials on external websites without the approval of the instructor violates intellectual property laws and is therefore **strictly forbidden.** Any student caught cheating on homework will be assessed a penalty of 20 points, in addition to a grade of zero for the given homework assignment. **Students are encouraged to seek help from their instructors during office hours**.

Grading Policy: The final grade in this course will be determined by a point total based on the following:

Homework	150
Class Participation (recitation 140 points + 35 points class Participation + 5 points syllabus quiz)	180
Weekly Lecture Quizzes	70
Exam I	100
Exam II	100
Exam III	100
Final Exam	300
Total points	**1000**

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

A	> 835	**C**	600-659
B+	775-834	**D**	550-599
B	710-774	**F**	< 550
C+	660-709		

You must maintain an average of 35%, which is 234 points in the common exams, quizzes, and final to be considered for a grade of D or higher. You will receive an F even if you have adequate point total without this requirement.

IN CLASS EXPECTATIONS: The classroom is meant to be an inclusive and respectful environment where all students can feel comfortable expressing their ideas. Therefore, please treat the classroom as a professional environment. It is the job of everyone in the classroom to be respectful, use appropriate language, and behave appropriately. Discrimination or mistreatment of any kind for any reason will not be tolerated and will be reported to the Dean of Students.

This course is meant to challenging and I will work to challenge you in your knowledge of chemistry and its application in problem solving. It's okay to make errors if you learn from them. Learn from your mistakes and get help when you need it from me or the tutoring center.

ATTENDANCE POLICY: Attendance to both lecture and recitation classes will be recorded and is **mandatory**. Each class is a learning experience that cannot be replicated through simply "getting the notes." This is also a highly compacted course and even one absence may cause a steep drop in course performance. Absences for unavoidable legitimate reasons will be permitted upon presentation of appropriate supporting documentation to the Dean of Students. During lectures, you will be tasked with answering polled questions.

LECTURE (IN PERSON): A computer and scientific (non-graphing, non-programmable) calculator are required for all lectures. You are expected to come to lecture after having reviewed the lecture notes available in Canvas. Instruction will be offered *in person* unless the University mandates virtual instruction, so assume *in person attendance is required* for all the classes. A laptop/tablet/phone with internet capability is required for all classes as I will be presenting poll question to you for participation points and there will be an end of lecture quiz each weak on Canvas. A lot of problem -solving is done during class, so a notebook where you can do problems by hand is highly recommended.

At the end of each lecture a 1-2 question quiz will be given in class lasting approximately 10 minutes. You must have a device capable of running Respondus Lockdown Browser in order to take the quiz. You will submit your answers to the quiz in canvas and then submit an image of your work for grading. Each quiz is worth 5 points. 2.5 points will be awarded for the correct answer and 2.5 points will be awarded for the proper work.

If your technology malfunctions and you are unable to participate in polling, then send email to your instructor explaining the problem **immediately** or the **same day** to receive participation points. Please include your name, the course number and section on your email. Failure to notify the instructor properly or in a timely manner will result in loss of participation points for that day.

POLLING IN CLASSROOM: In order to gauge your comprehension, encourage participation, and track attendance I will use using Poll Everywhere. When creating your profile, please use your name and NJIT email as it appears on the class roster. I will be using this app to assign grades so having the correct name and email is vital to getting the points you earned!

CLASS RECORDINGS: Class sessions may be recorded by me so you can review them in the future. These recordings shall only be used as an educational resource and are not to be distributed or used outside of this class. Information on how to access recorded lectures will be made available. Any recordings that contain identifiable information about students will not be used beyond this semester.

CLASS RECORDING ETIQUETTE*:* You are expected to respect their fellow students' privacy and freedom to learn without disruption. You are not allowed to capture or reproduce anyone's name, image, or voice without permission. You must be polite and respectful in the online chat. Informal chat is okay, but typing is restricted to things that one would say out loud in front of the entire class. Students must always conduct themselves on their webcam video as they would in person in a classroom.

RECITATION (SECOND LECTURE PERIOD) IN PERSON: For recitation, you will be given a worksheet to solve. You will be given adequate time to complete the worksheets and upload your work and enter your answers in Canvas. These worksheets are essential for helping you learn and are worth points. So please take the time to do the work neatly and upload them in the space provided in CANVAS. If you miss a recitation for a valid reason must still make up the worksheet to get credit.

HOMEWORK POLICY: Homework is 100% online and accessed via CANVAS. The homework is to test your understanding of the material being taught. This homework will build on the classroom content and enhance your understanding of the material. This homework will also be good preparation for the common exams. To maximize your ability to learn through homework each assignment allows multiple attempts. It is important that you aim to get > 90% in all your homework to get the most benefit.

Each homework assignment has its due date. In addition, Canvas has a calendar with due dates. **ALL HOMEWORK MUST BE DONE ON TIME. For each day homework is submitted after the due date, the maximum achievable points will be deducted 25% (2.5 points). By the end of second day, you can only earn up to 5 points (50% deduction). After the fourth day, you won't be able to earn any points (100% deduction).**

Unexpected events, like Canvas server being down, may occur but they **are not** considered **valid excuses** for missing a due date. Only the excuses that are validated via the Dean of Students Office will be accepted.

EXAMS: There will be three midterm (Common) exams and one comprehensive final exam.
Common Exams are held during the regular class time. They start at 6:00 PM in *ECEC 115*. Plan to be in your seats by 5:45 PM

Common Exam I	**10/22/2025**
Common Exam II	**11/19/2025**
Common Exam III	**12/10/2025**
Final Exam Period	**TBD**

The Final Exam will test your knowledge of *all the course material* taught *in both this entire course as well as chem125*.

ADMINISTRATION OF EXAMS: The Common and Final Exams will be administered in person unless University Policies dictate otherwise

Students may only use scientific (non-programmable, non-graphing) calculators on exams and #2 pencil. The student will also be asked to show a photo-ID. **No cell phones**, **tablets**, **other computers**, **smartwatches**, or anything else which can access the internet should be anywhere near the exam-- any indication of cell phone, headphones or smart device presence (a ring tone, vibration, music, or a visible phone) will result in a point penalty or a zero on the exam. Talking to anyone during the exam is not permitted.

During the exam, you have to adopt the following behaviors:

1. No cell phones, tablets, other computers, headphones, smartwatches, or anything else which can access the internet should be anywhere near the exam-- any indication of cell phone presence (a ring tone, vibration, music, or a visible phone) will result in a point penalty.

2. Not talking to anyone.
3. No listening to music or having headphones/earbuds on.
4. No smart devices such as smartphones, smartwatches, or smartglasses may be on your person.

To protect the test's integrity, anyone found to violate any of the rules (1-4) of an exam will be docked 10 points for each violation from their exam score or be given a zero.

TEST GRADING ERROR: Test scores will be available in Canvas roughly 2 weeks after the test. If you wish to go over your exam, arrange to meet your instructor during office hours. If you believe there is an error, you have one week after scores are posted to discuss the error with your instructor during office hours.
ALL ERRORS NEED TO BE BROUGHT TO THE INSTRUCTOR'S ATTENTION WHEN THEY OCCUR. DO NOT WAIT UNTIL THE END OF THE SEMESTER.

MAKEUP EXAM POLICY: There will normally be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event that you have a legitimate reason for missing a quiz or exam, you 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. You must also notify the CES Department Office/Instructor that the

exam will be missed. **One *cumulative* *make-up examination*** will be permitted at the end of the semester if there is an acceptable and substantial reason. A grade of zero will be given for a second missed examination independent of reason

Using Respondus LockDown Browser and a Webcam for Online Exams

Respondus LockDown Browser is a locked browser that prevents you from printing, copying, going to another URL, or accessing other applications during a quiz. If a Canvas quiz requires that LockDown Browser be used, you will not be able to take the assessment or quiz with a standard web browser. You may be required to use LockDown Browser with a webcam (Respondus Monitor), which will record you during an online exam. The webcam can be built into your computer or can be the type that plugs in with a USB cable. Watch this short video to get a basic understanding of LockDown Browser and the webcam feature. A student Quick Start Guide (PDF) is also available.

1. Download and install LockDown Browser from this link:
   http://www.respondus.com/lockdown/download.php?id=264548414
2. Once your download has finished, locate the "LockDown Browser" shortcut on the desktop and double-click it. (For Mac users, launch "LockDown Browser" from the Applications folder.)
3. You will be brought to the Canvas or Moodle login page within the LockDown Browser. If you are in Moodle, click "Login with your UCID" to log in with your NJIT UCID and password and then click Login.
4. Under "My courses," click on the course in which you have to take the exam that requires the LockDown Browser. After you enter the course, find the exam and click on it.
5. A confirmation prompt will appear. Click the "Start attempt" button. Once a quiz has been started with LockDown Browser, you cannot exit until the Submit all and finish button is clicked.
6. If you are required to use a webcam (Respondus Monitor), you will be prompted to complete a Webcam Check and other Startup Sequence steps.

HOW TO SUCCEED IN THIS COURSE:

You are responsible for utilizing the resources provided, like pre-recorded lectures, to help yourself learn. You will benefit from the lecture and recitation only if you come prepared to class. Please plan to spend at least 6-9 hours each week outside the lecture/recitation period for this class. **Spend a little time on chemistry and problem-solving every day!** All instructors will provide their availability for office hours where you can go for extra help. In addition, the Chemistry Tutoring Center will be a useful resource where you can get help from peers. On a weekly basis you need to plan for:

a) Time to listen to pre-recorded lectures (before the class) and review the textbook chapter
b) Prepare questions to ask the professor during class
c) Review material and come prepared to do the recitation problems
d) Time to do the online homework and textbook problems
e) Work on the Review Packets

IMPORTANT DATES: (See Fall 2025 Academic Calendar)

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

Course Outline

This is the second part of a two-course Chemistry sequence. This course builds on content from Chem 125. So, it is expected that the student will have reviewed Chapters 1-11 before starting this course.

Week	Outcomes	Topic	Homework
1 9/3	1,2,3,8,9	Chapter 17: Chemical Kinetics	Warm up Basic HW Chapter 17 HW – part 1 Recitation #1
2 9/10	1,2,3	Chapter 17: Chemical Kinetics	Chapter 17 HW – part 2 Recitation #2
3 9/17	18,19,20,21	Chapter 12: Thermodynamics	Chapter 12 HW Recitation #3
4 9/24	4,5,6,7,10	Chapter 13: Fundamental Equilibrium Concepts	Chapter 13 HW – part 1 Recitation #4
5 10/1	4,5,6,7	Chapter 13: Fundamental Equilibrium Concepts	Chapter 13 HW – part 2 Recitation #5
6 10/8	11,12,13,14,15,17	Chapter 14: Acid-Base Equilibria	Chapter 14 HW – part 1 Recitation #6
7 10/15	11,12,13,14,15,17	Chapter 14: Acid-Base Equilibria	Chapter 14 HW – part 2 Recitation #7
8 10/22	11,12,13,14,15,17	Chapter 14: Acid-Base Equilibria	Chapter 14 HW – part 3 Recitation #8
10/22		**EXAM 1: Chapters 17, 12 and 13**	
9 10/29	15	Chapter 11.4 Colligative Properties Chapter 15: Equilibria of Other Reaction Classes	Chapter 15 HW – part 2 Recitation #9
10 11/5	22,23,24,25,26,	Chapter 16: Electrochemistry	Chapter 16 HW Recitation #10
11 11/12	22,23,24,25,26,	Chapter 16: Electrochemistry	Chapter 16 HW – part 1 Recitation #11
12 11/19	33,34	Chapter 21: Organic Chemistry	Chapter 21 HW – part 2 Recitation #12
11/19		**EXAM 2: Chapters 14, 15, and 11.4**	
13 12/3	27,28,29,30,31,32	Chapter 10.1, 10.5, and 10.6 Chapter 20: Radioactivity and Nuclear Chemistry	Chapter 20 HW Recitation #13
14 12/10		Chapter 20: Radioactivity and Nuclear Chemistry and Review	Chapter 20 HW Recitation #14 Basic: Chapters 1-8 Basic Chapters 9-12 ACS reviews: I and II
12/10		**EXAM 3: Chapter 16 and 21**	