

CHEM 121

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 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.

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 121 – Fundamentals of Chemical Principles I. Introduces the basic concepts of chemistry, including chemical reactions and bonding, electronic and molecular structure, gases, and thermochemistry.

Number of Credits: 3

Corequisites: Math 108 or equivalent

Course-Section and Instructors

Course-Section	Meeting Times	Instructor
Chem 121-001	T 4:00 PM – 5:20 PMWest Lect 1 R 4:00 PM – 5:20 PM.....Kupf 107	Edens
Chem 121-003	T 4:00 PM – 5:20 PMWest Lect 1 F 4:00 PM – 5:20 PM.....FMH 306	Edens

Office Hours: TBA **Location:** Tier 323a (across from 309) in person or by appointment

Zoom meeting room: <https://njit.zoom.com/join/name>

Webpage: The course website is available through Canvas, which can be accessed via canvas.njit.edu. Please email your instructor immediately if you cannot access the class site. All materials including lecture summaries, any 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 your instructor as soon as possible.

Required Textbook:	Title	Chemistry
	Author	Zumdahl, Zumdahl, and DeCoste
	Edition	Tenth
	Publisher	Cengage
	ISBN #	ISBN-13: 978-1-305-95740-4
Required Homework Portal:	Title	Aktiv
	ISBN #	Inquire at bookstore
Auxiliary Text (free):	Openstax	https://openstax.org/details/books/chemistry-

Suggested Material: Follow Instagram page @crashchemPD or visit CrashchemPD youtube channel

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, Rm. G12. Students 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 between Monday – Friday 10:00 am - 6:00 pm, either virtually or in-person. Note: the Tutoring Center is not open during the first week of classes.

Accommodation of Disabilities: Office of Accessibility Resources and Services, 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 disability, 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 of the Dean of Students at <https://www.njit.edu/dos/>

Learning Outcomes – You should be able to:

1. Learn measurement units and perform unit conversions systematically using dimensional analysis or multiplication by one
2. Explain atomic structure and determine average atomic mass.
3. Learn to use periodic table to predict charges on atoms.
4. Understand mole concept: convert mass into moles and vice versa
5. Write chemical formulas of compounds using the periodic table and name ions and simple compounds.
6. Calculate mass of molecules, and mass % of individual atoms in compounds
7. Calculate moles, molecular and empirical formula of a compound from basic principles using proper unit conversions
8. Balance chemical equations
9. Identify various types of chemical reactions and apply the concept of limiting reagent to calculate percentage yield of products in different reaction types.
10. Define solute, solvent and apply mole concept in aqueous solutions.
11. Determine oxidation states of elements in compounds
12. Describe acid-base, precipitation and redox reactions in solution
13. Understand Kinetic model of gases and apply various gas laws in problem solving.
14. Apply first law of thermodynamics to chemical problems and calculate the energy changes in chemical reactions
15. Explain the quantum mechanical basis for the sub-structure of the atom
16. Write the electronic configuration for the elements in the periodic table and describe trends in periodic properties
17. Draw the Lewis dot structures for simple molecules and exceptions to octet rule
18. Discuss electronegativity and bond polarity
19. Use VSEPR to predict shapes of molecules and whether a molecule will have a dipole moment
20. Identify sigma and pi bonds and explain the hybridization of the molecules
21. Explain intermolecular force and the differences in bonding patterns between solids liquids and gases

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.

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 of course materials on external websites without the approval of the instructor violates intellectual property laws and hence 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 (worksheet 140 points + 28 points class Participation + 5 points syllabus quiz + 4 points feedback forms + 3 points Academic Engagement)	180
Weekly Lecture Quizzes – Canvas with Respondus Lockdown Browser	70
Exam I	100
Exam II	100
Exam III	100
Final Exam	300

Total points	1000
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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 finals 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 be 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 at both lecture and recitation classes will be recorded through Aktiv 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.

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 &/or the relevant textbook section(s). Instruction will be offered *in person* unless the University mandates virtual instruction, so assume *in person attendance is required* for all the classes. A lot of problem-solving is done during class, so a notebook where you can do problems by hand is highly recommended.

Each lecture you will be provided with a worksheet for immediate practice of the concepts covered in lecture. After a concept is presented and exemplified by your instructor, you will be given the opportunity to interact with the material using the worksheet. You will enter your answers in Canvas Quiz and upload a picture of your work; your work must be shown or the points for canvas quiz will be changed to zero. You must be in lecture to receive a grade for worksheets; if you were not present in lecture, you will not be given worksheet points. There is no makeup of worksheets unless you have a Dean's note. If you miss class for a valid reason and have a Dean's note, you must make up the worksheet in the instructor's office hours.

At the end of lecture one time weekly a 2 question quiz worth 5 points will be given to ensure you are engaged with the lecture and to test you on your new knowledge. You must bring a device to class that is capable of running Respondus lockdown browser. The quiz will cover the material covered that day in lecture; therefore, it is vital that you pay attention that day in class. Starting on week 2, two questions will be presented and you will have 5-10 minutes to complete them.

You must work individually to complete the quiz in Respondus lockdown browser. You must submit the quiz and your work in separate assignments. Each question will be worth 2 points and the work is worth 1 point. If no work is presented for the problems, you will receive a zero on that question regardless of a correct answer.

The quiz must be completed in class and will be password-locked, so ensure completion in the lecture time. If you were

to give the password to a classmate who is not in attendance that day, you will both receive a zero and be reported to the Dean of Students for cheating.

If your technology malfunctions and you are unable to participate in worksheet upload or quiz, send email to your instructor explaining the problem 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.

CLASS RECORDINGS: Class sessions may be recorded by the instructor. 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 by your instructor. Any recordings that contain identifiable information about students will not be used beyond this semester.

CLASS RECORDING ETIQUETTE: Students are expected to respect their fellow students' privacy and freedom to learn without disruption. Students are not allowed to capture or reproduce anyone's name, image, or voice without permission. They 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.

COURSE LEARNING RESPONSIBILITY: COVID-19 pandemic has required that both instructors and students make changes to their normal working protocols for courses. We will still have content and quizzes online. As a result, students 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. Students may not collaborate on exams or assignments, directly or through virtual consultation, unless the instructor gives 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. All students should be familiar with the NJIT integrity code: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

In addition to adhering to the NJIT Integrity statement, learning in the current environment also places a significant amount of responsibility on you. Please utilize all the resources that are available to you to be successful in the courses. Examples include paying full attention in class, copying notes, accessing the tutoring center, going to instructor office hours for help.

HOMEWORK POLICY: Homework is 100% online and accessed via Aktiv. **You must purchase a subscription to Aktiv. Download Aktiv Learning from the App store or Play store of your iphone, ipad, or Android device. You may purchase your subscription through the bookstore or at the Aktiv site. The way to join a course will be described by your instructor, either through a link on Canvas or by using a Course Code. All homework assignments will be through Aktiv.** 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 the homework each assignment allows multiple attempts. It is important that you aim to get > 90% in all your homework to get the most benefit. Upon completing a math readiness assignment, you will be provided with a personalized study plan.

Each homework assignment has its due date, as shown on Aktiv. **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 the 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 held in common hours during the semester and a comprehensive final exam. The following exam periods are tentative and therefore possibly subject to change:

Common Exams are held on Mondays during the common hour. They start at 4:15PM in assigned rooms (TBD). Plan to be in your seats by 4:00PM

Common Exam I	Monday October 20
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Common Exam II	Monday November 17
Common Exam III	Monday December 8
Final Exam	TBD

The final exam will be a cumulative exam on chapters 1-11.

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, 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.
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 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. **One cumulative make-up examination and quiz** 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 the 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 or exam. If a Canvas quiz or exam requires that LockDown Browser be used, you will not be able to take the assessment with a standard web browser. The LockDown Browser with a webcam (Respondus Monitor) will record you during an online exam.

The webcam can be built into your computer or it can be a separate unit 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.
5. After you enter the course, find the exam and click on it.
6. 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.
7. 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 by looking through the slides or watching the videos provided by your instructor. Please plan to spend at least 6-9 hours each week outside the lecture/recitation period for this class.

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	Monday	Labor Day. University closed
Sept	2	Tuesday	First Day of Classes
Sept	8	Monday	Last Day to Add/Drop a Class
Sept	8	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
Sept	9	Tuesday	W Grades Posted for Course Withdrawals
Sept	15	Monday	Last Day for 90% Refund, Full or Partial Withdrawal, No Refund for Partial Withdrawal after this date
Sept	29	Monday	Last Day for 50% Refund, Full Withdrawal
Oct	2	Thursday	Wellness Day

Oct	20	Monday	Last Day for 25% Refund, Full Withdrawal
Nov	10	Monday	Last Day to Withdraw from Classes
Nov	25	Tuesday	Thursday Classes Meet
Nov	26	Wednesday	Friday Classes Meet
Nov	27	Thursday	Thanksgiving Recess Begins. No Classes
Nov	30	Sunday	Thanksgiving Recess Ends
Dec	11	Thursday	Last Day of Classes
Dec	12	Friday	Reading Day
Dec	13	Saturday	Saturday Classes Meet
Dec	14	Sunday	Final Exams Begin
Dec	20	Saturday	Final Exams End
Dec	22	Monday	Final Grades Due

(Continued next page)

Course Outline

Week	Outcomes	Topic	Homework
1 9/2 - 9/8	1	Chapter 1: Chemical Foundations	Math skills assessment Chapter 1 homework
2 9/9 - 9/15	2,3,4	Chapter 2: Atoms, Molecules and Ions	Chapter 2 homework
3 date	4,5,6,7,8	Chapter 3: Stoichiometry	Chapter 3 homework – part 1
4 date	4,5,6,7,8	Chapter 3: Stoichiometry	Chapter 3 homework – part 2
5 date	8,9,10, 11, 12	Chapter 4: Types of Chemical Reactions and Solution Stoichiometry	Chapter 4 Homework – part 1
6 date	8,9,10, 11, 12	Chapter 4: Types of Chemical Reactions and Solution Stoichiometry	Chapter 4 Homework – part 2
7 date	13	Chapter 5: Gases	Chapter 5 Homework
date		EXAM 1: Chapters 1-3 (Monday, October 20)	
8 date	14	Chapter 6: Thermochemistry	Chapter 6 Homework
9 date	15,16	Chapter 7: Atomic Structure and Periodicity	Chapter 7 Homework – part 1
10 date	15,16	Chapter 7: Atomic Structure and Periodicity	Chapter 7 Homework – part 2
11 date	17, 18, 19	Chapter 8: Bonding: General Concepts	Chapter 8 Homework
date		EXAM 2: Chapters 4-6 (Monday, November 17th)	
12 date	18, 19, 20	Chapter 9: Covalent Bonding: Orbitals	Chapter 9 Homework
13 date	21, 22, 23	Chapter 10: Liquids and Solids	Chapter 10 Homework
14 date	24	Chapter 11: Properties of Solutions	Chapter 11 Homework
date		EXAM 3: Chapters 7-9 (Monday, December 8th)	
15 date		Final Exam Review	Review Homework

Updated by Dr. Gregory Edens – 2025
 Department of Chemistry and Environmental Science
 Course Syllabus Spring 2025