

Spring 2020

## **CHEM 121-002:Fundamentals of Chemical Principles I**

Tamara Gund

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**Chemistry: chem121**  
*Spring 2020 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:** Chem 121 002  
TR 02:30 PM - 03:50 PM, Tiernan 114

**Number of Credits:** 3

**Prerequisites:** Math 108 or better

**Course-Section and Instructors**

Course-Section	Instructor
Chem 121 001	Dr. Tamara Gund

**Office Hours:** *also by appointment*

M	T	W	R	F
3:00P - 4:00P	1:00P - 2:00P		12:00P - 1:00P	

**Required Textbook:**

<b>Title</b>	Chemistry
<b>Author</b>	Zumdahl, Zumdahl, and DeCoste
<b>Edition</b>	Tenth
<b>Publisher</b>	Cengage
<b>ISBN #</b>	ISBN-13: 978-1-305-95740-4

**University-wide Withdrawal Date:** The last day to withdraw with a **W** is Monday April 6, 2020. It will be strictly enforced.

### Learning Outcomes:

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. Define solute, solvent and apply mole concept in aqueous solutions.
10. Identify various types of chemical reactions and apply the concept of limiting reagent to calculate percentage yield of products in different reaction types.
11. Understand Kinetic model of gases and apply various gas laws in problem solving.
12. Apply first law of thermodynamics to chemical problems and calculate the energy changes in chemical reactions
13. Explain the quantum mechanical basis for the sub-structure of the atom
14. Write the electronic configuration for the elements in the periodic table and describe trends in periodic properties
15. Draw the Lewis dot structures for simple molecules and exceptions to octet rule
16. Discuss electronegativity and bond polarity
17. Use VSEPR to predict shapes of molecules and whether a molecule will have a dipole moment
18. Identify sigma and pi bonds and explain the hybridization of the molecules
19. Explain intermolecular force and the differences in bonding patterns between solids liquids and gases
20. Describe differences in basic crystalline shapes
21. Determine edge length and density of simple crystalline shapes.
22. Predict changes in freezing point, elevation in boiling point and osmotic pressure when a solute dissolves in a pure solvent

### 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 (Basic HW: 60 + Regular HW 100) points	160
Class Participation (recitation + lecture)	190
Common Exam I	125
Common Exam II	125
Common Exam III	125
Final Exam	275
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 228 points in the common exams 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.**

**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.”

**Lecture:** An I-clicker and calculator are required for all lectures. If your iclicker malfunctions, you are required to inform the instructor, either in person or via e-mail the **same day**. Failure to notify the instructor will result in loss of points for that day. If you are in class, but using a cell phone in any way, using a computer, or listening to music you will not get credit for that day's attendance. If you are cheating (having a second I-clicker) you and the person for whom you are cheating will get 0 for the entire semester. There are ways to check! So, be honest.

**In class worksheets:** You are expected to come prepared to each class period by reviewing the textbook/slides in moodle. During each class period, the instructor will ask questions and/or be given a worksheet to solve. The worksheets are collected at the end of the recitation and graded. Students who did not succeed in completing the worksheet during the recitation have one week time to complete the worksheets during office hours. Students who miss a class for a valid reason must still make up the worksheet to get credit.

**Homework Policy:** There are two types of homework: Basic and Regular. *Total value = 160 points*

**Basic Homework, ~60 points:** It is recommended that you do the basic HW for the chapter before coming to the lecture. This homework is intended as a preparation for your participation in class. Getting > 70% in the basic homework before the lecture, will ensure you have the foundation necessary to understand what is being taught in class.

**Regular homework, ~100 points:** This 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.

All homework is very important. However, it is important that you aim to get > 90% in the basic and >70% in the regular HW to help you pass this class.

Each homework assignment has its due date. In addition, Moodle has a calendar with due dates. **ALL HOMEWORK MUST BE DONE ON TIME.** There is no credit for late homework. DO NOT WAIT TO THE LAST MINUTE TO DO YOUR HOMEWORK. ONLINE SYSTEMS ARE NOT 100% RELIABLE AND UNEXPECTED EVENTS MAY OCCUR. IN GENERAL, THERE IS NO LATE HOMEWORK AND MOODLE BEING DOWN IS NOT A VALID EXCUSE. PLAN TO FINISH YOUR HOMEWORK AT LEAST ONE DAY BEFORE IT IS DUE.

**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:

Common Exam I	Monday 4:30 - 5:45pm - 2/17/20
Common Exam II	Monday 4:30 - 5:45pm - 3/23/20
Common Exam III	Monday 4:30 - 5:45pm - 4/20/20
Reading Days	May 6 <sup>th</sup> to 7 <sup>th</sup>
Final Exam Period	May 8 <sup>th</sup> to 14 <sup>th</sup>

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

**TEST GRADING ERROR.** Tests are returned in recitations following the test. If you believe there is an error, you have until the Thursday following the test to submit a test for regrading. You must write a very brief description of the problem on the back of the test. (The answer key is provided in Moodle in the TEST INFORMATION book. You should always learn from your mistakes and go over the answer key.)

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** 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. **Tentative date of the makeup exam is May 7<sup>th</sup> at 7.00 am.**

**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.

## ADDITIONAL RESOURCES

**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.

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/studentsuccess/disability-support-services/>

**Important Dates** (See: [Spring 2020 Academic Calendar](#))

Date	Day	Event
January 21, 2020	T	First Day of Classes
January 31, 2020	F	Last Day to Add/Drop Classes
March 15 - 22, 2020	Su - Su	Spring Break
April 6, 2020	M	Last Day to Withdraw
April 10, 2020	F	Good Friday, University is closed
May 5, 2020	T	Friday classes meet
May 5, 2020	T	Last Day of Classes
May 6 and 7, 2020	W-R	Reading Days
May 8 - 14, 2020	F - R	Final Exam Period

## Course Outline

Week	Outcomes	Topic	Homework
1	1	Chapter 1: Chemical Foundations	Warm up Basic HW Basic HW: Sig Figs Basic HW: Dimensional Analysis Regular HW
2	2,3	Chapter 2: Atoms, Molecules, and Ions	Basic HW Regular HW
3, 4	4,5,6,7,8	Chapter 3: Stoichiometry	Basic HW Basic Homework II: ***Using balanced equations*** Regular HW
<b>EXAM 1: Chapters 1-3 (9/30/2019)</b>			
5, 6	9,10	Chapter 4: Types of Chemical Reactions and Solution Stoichiometry	Basic HW Regular HW
7	11	Chapter 5: Gases	Basic HW Regular HW
8, 9	12	Chapter 6: Thermochemistry	Basic HW Regular HW
<b>EXAM 2: Chapters 4-6 (11/4/19)</b>			
10, 11	13, 14	Chapter 7: Atomic Structure and Periodicity	Basic HW I Regular HW I Basic HW II Regular HW II
12	15, 16, 17	Chapter 8: Bonding: General Concepts	Basic HW Regular HW
13	18	Chapter 9: Covalent Bonding: Orbitals	Basic HW Regular HW I Regular HW II
<b>EXAM 3: Chapters 7-9 (12/2/19)</b>			
13, 14	19, 20, 21	Chapter 10: Liquids and Solids	Basic HW Regular HW
14	22	Chapter 11: Properties of Solutions	Basic HW Regular HW
<b>FINAL EXAM Review</b>			
15	1 - 22		Basic: Chapters 1-8 Basic Chapters 9-12 ACS reviews: 1-6

