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CHEM 121-002: Fundamentals of Chemical Principles I

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THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

CHEM 121
Spring 2021 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 on. 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 of F, 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

COURSE INFORMATION

Course Description: Chem 121 Section 002
TR 04:00 PM - 05:20 PM, TIERNAN HALL LECTURE 1
Number of Credits: 3
Prerequisites: Math 108 or equivalent
Course-Section and Instructors

Course-Section	Instructor
Chem 121: 001	Dr. Francis Osonga

Office Hours: by Webex or appointment

M	T	W	T	F
4.30 PM- 5.30 PM		1.00 PM- 2.00 PM		

Required Textbook:

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

University-wide Withdrawal Date: The last day to withdraw with a **W** is Monday, April 5, 2021.

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. 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
22. Describe differences in basic crystalline shapes
23. Determine edge length and density of simple crystalline shapes.
24. 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	200
Class Participation (recitation + lecture)	150
Common Exam I, February 22, 2021	175
Common Exam II, March 29, 2021	175
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 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 (CONVERGED): A computer and calculator are required for all lectures. Students are expected to come to lecture after having reviewed the pre-recorded lecture notes available in Canvas. Instruction will be offered in a Converged mode, however a laptop will be required for all classes. We will be doing a lot of problem -solving, so a paper notebook where you can do problems is highly recommended.

If your computer malfunctions and you are unable to attend class either in person or remotely, you are required to inform the instructor, via e-mail the **same day**. Failure to notify the instructor will result in loss of points for that day.

Software to install on your computer for this course (download links are provided on canvas as well):

1. **Webex** (this course will use webex). You can download webex at <https://njit.webex.com/>
The webex links for each lecture will be provided on canvas).
2. **RESPONDUS Lockdown Browser** (Will be used for exams; requires webcam monitoring):
<https://download.respondus.com/lockdown/download.php?id=264548414>

RECITATION (SECOND LECTURE PERIOD) CONVERGED: Each recitation, the students will be given a worksheet to solve. You will be given adequate time to complete the worksheets and upload your work. 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. Students who miss a recitation for a valid reason must still make up the worksheet to get credit.

CONVERGED LEARNING RESPONSIBILITY: The shift to remote and converged teaching due to the COVID-19 pandemic has required that both instructors and students make changes to their normal working protocols for courses. 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, converged learning also places a significant amount of responsibility on you. Please review the email sent by the registrar for detailed instructions on classroom assignment and dates when you will be on campus. This can be accessed via **Back2Classroom** app. More details can be found at:

<https://back2classroom.njit.edu/getting-started-students>

HOMEWORK POLICY:

Your Homework will be 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.

All homework is very important. However, it is absolutely 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, 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 two 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 – 02/22/2021
Common Exam II	Monday 4:30 - 5:45pm – 03/29/2021
Reading Days	May 5th and May 6th
Final Exam Period	May 7th – May 13th

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

ADMINISTRATION OF EXAMS:

The Common and Final Exams will be administered using the RESPONDUS browser with Webcam. **This browser is available in Canvas**

During the exam, you have to adopt the following behaviors

1. No cell phones anywhere near the exam-- any indication of cell phone presence (a ring tone, vibration, music, will result in a point penalty)
2. No Talking to family members.
3. No Covering of face (either with clothing or hand)
4. No Moving out of frame.
- 5.. No Listening to music.

Setting up the camera so that the camera's view is not completely on student and workspace.

To protect the test's integrity, anyone found to violate any of the rules (2-6) of an exam or have facial recognition for less than 50% of the exam time will be docked 10 points for each violation from their exam score.

We understand these are difficult times and it is natural to move around when taking an exam in the comfort of your home. We must remind you that this is a high stakes exam and must be treated as such. Please observe all exam rules as if you were taking the exam in person.

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 will be provided in Canvas. 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 during the week of May 3rd.**

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.

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 worksheets
- d) Time to do the online homework

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. 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

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. 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 2021 Academic Calendar, Registrar](#))

Date	Day	Event
January 18	M	Martin Luther King, Jr. Day
January 19	T	First Day of Classes
January 23	S	Saturday Classes Begin
January 25	M	Last Day to Add/Drop a Class Last Day for 100% Refund, Full or Partial Withdrawal
January 26	T	W Grades Posted for Course Withdrawals
February 2	T	Last Day for 90% Refund, Full or Partial Withdrawal No Refund for Partial Withdrawal after this date
February 15	M	Last Day for 50% Refund, Full Withdrawal
March 8	M	Last Day for 25% Refund, Full Withdrawal
March 14	Su	Spring Recess Begins-No Classes Scheduled- University Open
March 21	Su	Spring Recess Ends
April 2	F	Good Friday- No Classes Scheduled- University Closed
April 5	M	Last Day to Withdraw
May 4	T	Friday Classes Meet Last Day of Classes
May 5	W	Reading Day 1
May 6	Thu	Reading Day 2
May 7	F	Final Exams Begin
May 13	Thu	Final Exams End
May 15	S	Final Grades Due

Course Outline

Week	Outcomes	Topic	Homework
1	1	Chapter 1: Chemical Foundations	Warm up Basic HW Chapter 1 homework
2	2,3	Chapter 2: Atoms, Molecules, and Ions	Chapter 2 homework
3,4	4,5,6,7,8	Chapter 3: Stoichiometry	Chapter 3 homework
EXAM 1: Chapters 1- 3 (Monday 02/22/21)			
5,6	9,10	Chapter 4: Types of Chemical Reactions and Solution Stoichiometry	Chapter 4 Homework
7	11	Chapter 5: Gases	Chapter 5 Homework
8,9	12	Chapter 6: Thermochemistry	Chapter 6 Homework
EXAM 2: Chapters 4- 6 (Monday 03/29/21)			
10,11	13,14	Chapter 7: Atomic Structure and Periodicity	Chapter 7 Homework
12	15,16,17	Chapter 8: Bonding: General Concepts	Chapter 8 Homework
13	18	Chapter 9: Covalent Bonding: Orbitals	Chapter 9 Homework
13,14	19, 20, 21	Chapter 10: Liquids and Solids	Chapter 10 Homework
14	22	Chapter 11: Properties of Solutions	Chapter 11 Homework
15	1 - 22	FINAL EXAM Review	Homework: Chapters 1-8 Homework: Chapters 9-12 ACS reviews : 1-6

