Fall 2021

CHEM 121-001: Fundamentals of Chemical Principles I

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NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

CHEM 121

Fall 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 001**
TR 01:00 PM - 02:20 PM, *TIERNAN 114*
Number of Credits: 3
Corequisites: Math 110 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
1:30 PM-2:30 PM		**4:00 PM-5:00 PM**	**4:00 PM-5:00 PM**	

Webpage: The course website is available through Canvas, which can be accessed via the njit.edu. Please email me 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

University-wide Withdrawal Date: The last day to withdraw with a **W** is Wednesday, November 10, 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	150
Class Participation (recitation + lecture) **6 biweekly quizzes x 5 pts each (30 pts total)** **12 recitation worksheets x 10 pts each (120 pts total)** **Classroom attendance 50 pts**	200
Common Exam I	175
Common Exam II	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 through **iclicker** and is **mandatory**. Each class is a learning experience that cannot be replicated through simply "getting the notes."

LECTURE (IN PERSON): A computer and scientific (non-graphing, non-programmable) 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 person, so attendance is required for all the classes A laptop is required for all classes as instructors will administer online class quizzes. 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, 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.

ICLICKER IN CLASSROOM: In order to gauge student comprehension, encourage participation, and track attendance we will use using iClicker Cloud. Each student must download the iClicker Student (formerly iClicker Reef) app to their mobile device or laptop and sign up for the 6 month license. Students must

create an account in the application or, if they have an account already, simply sign in. **When creating your profile, please use your name and NJIT email as it appears on the class roster**. Instructors will be using this app to assign grades so having the correct name and email is vital to getting the points you earned! Once in the app, simply select the "add a class" button (top right, appears as a plus sign), search for New Jersey Institute of Technology, and select the course with the name your instructor provides.

RECITATION (SECOND LECTURE PERIOD) IN PERSON: 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.

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:

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 it due date. In addition, Canvas 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. UNEXPECTED EVENTS, like Canvas being down, MAY OCCUR but they are not considered valid excuses for missing a due date. 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	**October 4, 2021**
Common Exam II	**November 8, 2021**
Reading Days	**December 13 and 14**
Final Exam Period	**December 15- 21**

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

ADMINISTRATION OF EXAMS:

The Common will be administered **ONLINE, IN PERSON** the using the RESPONDUS browser with

webcam. This browser is available in Canvas. Students must complete a proper environment check before starting the exam in the exam video by showing their calculator, blank scratch paper, their work surface, cell phone is placed away from work area, and a 360 degree view of their workspace to confirm no information is posted around the work area. Students may only use scientific (non-programmable, non-graphing) calculators on exams. The student will also be asked to show a photo-ID.

The final Exam will be an in-person, proctored ACS final exam.

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. Not talking to anyone.
3. No covering of face (either with clothing or hand)
4. No moving out of frame.
5. No listening to music or having headphones/earbuds on.
6. No 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. 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 as these online exams may not be visible after submission. If you believe there is an error, you have one week after scores are posted to submit a test for regrading. You must describe the error via email to your professor for consideration.
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 December 6th.***

Using Respondus LockDown Browser and a Webcam for Online Exams

Respondus LockDown Browser is a locked browser for taking assessments or quizzes in Canvas or Moodle. It prevents you from printing, copying, going to another URL, or accessing other applications during a quiz. If a Canvas or Moodle 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.

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. 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 everyday!

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) Go to tutoring center in CKB Room G12 .The tutors can help with Canvas Homework
f) Go to Instructor office hours—this is particularly useful for clarifying concepts

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

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/

Accommodation of Disabilities: **O**ffice of **A**ccessibility **R**esources and (**OARS**, *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 Scott Janz, Associate Director at the Office of Accessibility Resources and Services at 973-596-5417 or via email at scott.p.janz@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: **Fall 2021 Academic Calendar**)

Month	Day	Weekday	Event
September	1	Wednesday	First Day of Classes
September	6	Monday	Labor Day
September	8	Wednesday	Monday Classes Meet
September	8	Wednesday	Last Day to Add/Drop a Class
November	10	Wednesday	Last Day to Withdraw from Classes
November	25	Thursday	Thanksgiving Recess Begins
November	28	Sunday	Thanksgiving Recess Ends
December	10	Friday	Last Day of Classes
December	13	Monday	Reading Day 1
December	14	Tuesday	Reading Day 2
December	15	Wednesday	Final Exams Begin
December	21	Tuesday	Final Exams End

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 10/04/21)	
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 11/08/21)	
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 - 20	**FINAL EXAM Review**	Review