

Fall 2019

# CHEM 125-015: General Chemistry I

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**CHEM 125 (DAY):**  
*Fall 2019 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 125

Number of Credits: 3

Corequisites: Math 110 or equivalent

Course-Section and Instructors

| Course-Section | Instructor |
|----------------|------------|
| Chem 125:      | Various    |

Office Hours:

Required Textbook:

|           |                                 |
|-----------|---------------------------------|
| Title     | Chemistry, A Molecular Approach |
| Author    | Nivaldo J. Tro                  |
| Edition   | Fifth                           |
| Publisher | Pearson                         |
| ISBN #    | ISBN-13: 978-0134874371         |

**University-wide Withdrawal Date:** The last day to withdraw with a **W** is Monday, November 11, 2019. 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. 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 (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.

**Recitation:** Students are expected to come to recitation after having reviewed the class lecture notes. Each recitation, the students will 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 recitation for a valid reason must still make up the worksheet to get credit.

**Homework Policy:** There are two types of homework: Basic and Regular.

**Basic Homework, worth 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, worth 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 absolutely 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 - 9/30/19                |
| Common Exam II    | Monday 4:30 - 5:45pm - 11/04/19               |
| Common Exam III   | Monday 4:30 - 5:45pm - 12/02/19               |
| Reading Days      | Dec 12 <sup>th</sup> and Dec 13 <sup>th</sup> |
| Final Exam Period | Dec 15 <sup>th</sup> - Dec 20 <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 Dec 6<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/studentuccess/disability-support-services/>

**Important Dates** (See: [Fall 2019 Academic Calendar, Registrar](#))

| Date                      | Day    | Event                                  |
|---------------------------|--------|--|
| September 3, 2019         | T      | First Day of Classes                   |
| September 10, 2019        | F      | Last Day to Add/Drop Classes           |
| November 11, 2019         | M      | Last Day to Withdraw                   |
| November 26, 2019         | T      | Thursday Classes Meet                  |
| November 27, 2019         | W      | Friday Classes Meet                    |
| November 28 - Dec 1, 2019 | R - Su | Thanksgiving Break - University Closed |
| December 11, 2019         | W      | Last Day of Classes                    |
| December 12 and 13, 2019  | Thu-F  | Reading Days                           |

## Course Outline

| Week                         | Outcomes   | Topic  | Homework   |
|------------------------------|------------|--|--|
| 1                            | 1          | Chapter 1: Matter, Measurement and problem solving                             | Warm up Basic HW<br>Basic HW I: Sig Figs<br>Basic HW II: Unit Conversion<br>Regular HW |
| 2                            | 2,3,4      | Chapter 2: Atoms and Elements  | Basic HW<br>Regular HW   |
| 3                            | 4,5,6,7    | Chapter 3: Molecules and Compounds   | Basic HW<br>Regular HW   |
| <b>EXAM 1: Chapters 1-3</b>  |            |  |  |
| 4                            | 8,9        | Chapter 4: Chemical Reactions and Chemical Quantities                          | Basic HW :<br>Regular HW I: Reaction Stoichiometry<br>Regular HW II% yield             |
| 5                            | 10, 11, 12 | Chapter 5: Introduction to Solutions and Aqueous Reactions                     | Basic HW<br>Regular HW   |
| 5                            | 13         | Chapter 6: Gases   | Basic HW<br>Regular HW   |
| 6                            | 14         | Chapter 7: Thermochemistry   | Basic HW<br>Regular HW   |
| <b>EXAM 2: Chapters 4-7</b>  |            |  |  |
| 7                            | 15         | Chapter 8: The Quantum Mechanical Model of the Atom                            | Basic HW<br>Regular HW   |
| 8                            | 16,17      | Chapter 9: Periodic Properties of the Elements                                 | Basic HW<br>Regular HW   |
| 9                            | 17, 18, 19 | Chapter 10: Chemical Bonding I: The Lewis Model                                | Basic HW<br>Regular HW   |
| 10                           | 18, 19, 20 | Chapter 11: Molecular shapes, Valence Bond Theory and Molecular Orbital Theory | Basic HW<br>Regular HW I<br>Regular HW II  |
| <b>EXAM 3: Chapters 7-11</b> |            |  |  |
| 11                           | 21         | Chapter 12: Liquids, Solids and Intermolecular Forces                          | Basic HW<br>Regular HW   |
| 12                           | 22, 23     | Chapter 13: Solids and Modern Materials  | Basic HW   |
| 13                           | 24         | Chapter 14: Solutions  | Basic HW<br>Regular HW<br>Class quiz- chapters 12-14                                   |

|    |        |                          |  |
|----|--------|--------------------------|--|
| 14 | 1 - 20 | <b>FINAL EXAM Review</b> | Basic: Chapters 1-8<br>Basic Chapters 9-12<br>ACS reviews: 1-6 |
|----|--------|--------------------------|--|

