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Fall 2018

# CHEM 125-H01: General Chemistry I (Honors)

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## Chemistry: *Fall 2018 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 125H

Number of Credits: 3

Corequisites: Math 110 or equivalent

#### Course-Section and Instructors

Course-Section	Instructor
Chem 125H:	Bhavani Balasubramanian

Office Hours:

#### Required Textbook:

Title	Chemical Principles
Author	Zumdahl and Decoste
Edition	8th
Publisher	Cengage
ISBN #	ISBN-13: 978-1305581982

**NOTE:** All course materials and homework will be administered through Canvas, a learning management system.

**University-wide Withdrawal Date:** The last day to withdraw with a W is Monday, November 12, 2018. It will be strictly enforced.

### General Learning Outcomes:

1. Perform fundamental calculations pertaining to mass, moles of atoms, energy of reaction and photons and bond energies
2. Synthesize multiple concepts into solutions for a single problem.
3. Generate original, scientifically sound approaches to problem solving
4. Perform molecular modeling to understand and appreciate the three dimensional structure of molecules
5. Develop elementary ideas of structure-function relationship in small molecules

### Specific 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 formula for, and name ions and simple compounds and calculate mass of molecules, and mass % of individual atoms in compounds
6. Calculate moles, molecular and empirical formula of a compound from basic principles using proper unit conversions
7. Balance chemical equations
8. Define solute, solvent and apply mole concept in aqueous solutions.
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. Understand Kinetic model of gases and apply various gas laws in problem solving.
11. Apply first law of thermodynamics to chemical problems and calculate the energy changes in chemical reactions
12. Explain the quantum mechanical basis for the sub-structure of the atom
13. Write the electronic configuration for the elements in the periodic table and describe trends in periodic properties
14. Draw the Lewis dot structures for simple molecules and exceptions to octet rule
15. Discuss electronegativity and bond polarity
16. Use VSEPR to predict shapes of molecules and whether a molecule will have a dipole moment
17. Identify sigma and pi bonds and explain the hybridization of the molecules
18. Explain intermolecular force and the differences in bonding patterns between solids liquids and gases
19. Describe differences in basic crystalline shapes
20. Determine edge length and density of simple crystalline shapes.
21. 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.

**Grading Policy:** The final grade in this course will be determined by a point total based on the following:

Homework (Basic HW: 100 + Regular HW 160) points	260
3 Supplement Exams ( 40 points each) + 1 project	190
Common Exam I	100
Common Exam II	100
Common Exam III	100
Final Exam	250

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 193 points in the common exams and finals to pass the course. 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.

**Supplement Exams:** The supplement exams are unique to the Honors class and test the students on the outcomes listed under “general outcomes”. The goal is to help the students learn to synthesize multiple concepts and recognize familiar concepts in complex problems. **The dates for the Supplement exam are: Sep 26<sup>th</sup>, October 29<sup>th</sup>, and Dec 5<sup>th</sup>.**

**Homework Policy:** There are two types of homework: Basic and Regular. All homework will be administered through Canvas, a learning management system.

**Basic Homework, worth 100 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 160 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, 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 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 - 10/1/18
Common Exam II	Monday 4:30 - 5:45pm - 10/22/18
Common Exam III	Monday 4:30 - 5:45pm - 11/12/18
Final Exam Period	December 15 - 21, 2018

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.

**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](tel: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/studentssuccess/disability-support-services/>

**Important Dates** (See: [Fall 2018 Academic Calendar, Registrar](#))

Date	Day	Event
September 4, 2018	T	First Day of Classes
September 10, 2018	M	Last Day to Add/Drop Classes
November 12, 2018	M	Last Day to Withdraw
November 20, 2018	T	Thursday Classes Meet
November 21, 2018	W	Friday Classes Meet
November 22 - 25, 2018	R - Su	Thanksgiving Break - University Closed
December 12, 2018	W	Last Day of Classes
December 14, 2018	F	Reading Day
December 15 - 21, 2018	F - R	Final Exam Period

## Course Outline

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

