

## **CHEM 3A: Introductory General Chemistry**

**Fall 2012 Section 56500**

**Lecture MW (5:30-6:45) in PHY 76**

**Lab W (7:00-9:50) in PHY 82**

**Instructor:** V. Cornel (lecture) and M. Naito (lab)

**Contact info:** e-mail vmcornel3@verizon.net using “Chem3A” in subject line, or 638-3641 ext 3449

**Webpage:** <http://blackboard.reedleycollege.edu>

**Office Hours:** PHY 78 (MWF) 10-11

**Tutoring:** Free tutoring available in the Tutorial Center (by the library).

**Course Objectives:** Chemistry 3A is an elementary survey course in chemistry including lab work. It is designed to give the student a chemistry background for a wide variety of careers including forestry, nutrition, nursing, physical therapy, teaching and other biological and health related fields.

**Course Prerequisite: Math 103** Students will need to be familiar with basic algebra before taking this course as there is a lot of math involved.

**Course Advisories:** ENGL 1A, CHEM10 or high school chemistry

### **Text and Materials:**

1. Nivaldo J. Tro: “Introductory Chemistry” **3rd** Edition or Customized edition available in our bookstore or on ebay. The Mastering Chemistry CD is not needed. The 4<sup>th</sup> Edition is out, but we will use the cheaper, 3<sup>rd</sup> edition
  2. Download [fill-in notes and the labs](#) weekly off Blackboard
- You will need [safety glasses](#) (\$5 at hardware store), and a [calculator](#) with “exp” (or “EE”) and “log” keys (\$12 at Walmart), but not a programmable calculator.

**Lecture Notes:** The ability to listen carefully and to take good lecture notes in an essential college skill. Students should print out the fill-in notes, homework and lab assignments off my Blackboard website prior to coming to class. Studies have shown that 90% of the lecture material is retained if you review the lecture within 24 hours after class. If you wait a week you will only retain 35%.

**Homework:** Homework will be assigned every lecture. It is essential to your success in this class that you do all the assigned homework and read the relevant sections in your Textbook. All homework will be collected at the beginning of the following lecture and selected problems graded. This is to ensure that you work consistently and can apply what you learn to problems. There will be no make-up homework assignments, but I will drop the lowest two homework assignments. Do not just copy somebody else’s homework or you will not be able to do the problems for yourself in the exams. You can ask another student or tutor to help you start some problems, but you need to work them out for yourself. Even if you get all the problems wrong, you will still get 70% for the assignment for attempting all the problems yourself and showing all your work. You will learn where you are going wrong when I go over the homework. The latest I will accept homework is just before I hand back the graded homework the next lecture. This is not ideal as you won’t have your homework in front of you when I go over it and you will lose 10% for the homework being late. Absence is not an excuse for not doing your homework as you can send it in with another student, or count that assignment as one you drop. If you leave the class or are disruptive while I go over homework, I will also deduct points. It is advisable to write out the homework questions as well as the answers so you can study your homework.

You can also do the corresponding odd number problems for extra practice and check the answers at the back of the book.

**Drop Date for a refund:** The last day to drop this class and get a refund is Aug 24.

**Drop Date to avoid a “W”:** The last day to drop this class to avoid a “W” is September 3 (on WebAdvisor)

**Drop Date for a “W”:** The last day to drop this class is Friday October 12. After this date a grade will be assigned.

**Change to Pass/No Pass:** The last day to make this change is September 14.

**Labor Day:** Monday Sept 3, no classes

**Veteran’s Day:** Monday, Nov 12, no classes

**Thanksgiving:** Thursday and Friday Nov 22-23, no classes

**Final Exam Date:** Monday, Dec 10 from 5:30-7:30 in PHY76. The American Chemical Society CHEM3A exam will be given (multiple choice and cumulative).

**Attendance:** Attendance in lecture and lab is mandatory. As an incentive to attend lectures, an additional two homework assignments will be dropped at the end of the semester if a student attends 90% of the lectures. The student will be dropped automatically if she/he misses the first day of class, without contacting the instructor. If a student misses more than 25% of the lectures/labs, without contacting the instructor with a valid excuse, they will also be dropped. Always inform the instructor ahead of time if you know you have to miss an exam. If you miss a lecture you need to read and summarize the chapter in the textbook **before** meeting with the instructor to discuss any problems. The homework will be on the internet notes so that you can do the homework even if you missed the lecture. There will be no make-up exams. The final exam grade will be counted for the grade for the missing exam. If you have not missed any exams, and do better in the final exam than one of the earlier exams, the final exam grade will replace the earlier exam grade.

**Grading and Exams:** There will be 5 exams covering the material of previous lectures and a cumulative final exam. These 6 exams will be equally weighted and count 65% all together (about 11% each).

Laboratory (25%):	
Lecture Material (75%):	<b>Exams 65%</b>
	<b>Homework Assignments 10%</b>

The grading scale to be used is **A** 90-100%, **B** 80-89%, **C** 70-79%, **D** 60-69%, **F** 0-59%

### **Student Learning Outcomes:**

Upon completion of this course, students will be able to:

- Use dimensional analysis to solve for an unknown parameter of density, volume, mass, pressure, temperature, molar mass, concentration, or an empirical formula.
- Construct and balance a chemical reaction and use the reaction to predict stoichiometric quantities.
- Explain concepts from the periodic table and the use the periodic table to solve chemical problems.
- Describe acid-base reactions and how to calculate pH.

- E. Name and draw Lewis diagrams of inorganic and molecular compounds from the formula and vice versa.
- F. Safely conduct laboratory experiments implementing concepts and principles learned in lecture.

### **Course Objectives:**

Upon completion of this course, students will be able to:

- A. demonstrate an appreciation for the impact of chemistry on modern society and the relationship between chemistry and other disciplines including agriculture, the medical field, and industry;
- B. classify types of matter, recognize physical properties and chemical properties, and a general understanding of the Law of Conservation of Mass and the Law of Conservation of Energy;
- C. perform unit conversions using the correct significant figures; between the English and metric systems, temperatures in different units, density, energy, and with SI units;
- D. use the periodic table to predict physical and chemical properties of elements and calculate molar masses of compounds and molecules;
- E. recognize the electromagnetic spectrum and have a basic understanding of the quantum mechanical model of the atom;
- F. demonstrate the ability to name inorganic compounds given their formulas, and write formulas given names;
- G. distinguish and identify metals, non-metals, metalloids, and the elements of alkali metals, alkaline earth metals, halogens, noble gases, transition metals, and elements of the lanthanide and actinide;
- H. distinguish and identify between different types of intramolecular and intermolecular forces of attraction present in various substances based on chemical formulas and structures;
- I. write Lewis Electron-Dot Formulas and identify the shape using VSEPR method;
- J. write and balance chemical equations, and use these equations along with stoichiometry and the mole concept to convert quantities (e.g. grams or moles) of a given substance into quantities of an unknown substance;
- K. calculate, empirical formulas, and percentage composition given the appropriate data;
- L. distinguish and balance chemical equations of different types of reactions;
- M. perform calculations involving a limiting reagent and determining the percent yield;
- N. predict the physical behavior of gases to pressure, temperature, and volume changes;
- O. solve simple mathematical problems involving formula calculations related to gas laws;
- P. use gas laws and stoichiometry to calculate quantities (e.g. moles, volume, grams) of gas produced or consumed during a reaction;
- Q. calculate various parameters of solutions including molarity, dilution techniques, percentage concentration, and density.
- R. construct heating and cooling curves;
- S. describe state and energy changes accompanying heating and cooling curves;
- T. apply the principles of equilibrium in reversible reactions, saturated solutions, solutions of weak electrolytes and solutions of gases in solving related problems;
- U. use solution properties and stoichiometry to calculate quantities (e.g. moles, volume, grams) produced or consumed during a reaction;
- V. describe colligative properties of solutions (e.g. boiling point elevation, freezing point depression, and osmotic pressure);
- W. define and identify acids and bases and be able to perform math calculations involving the pH;
- X. determine the nature and applications for electron exchange reactions;

- Y. understand the structure of the atomic nucleus;
- Z. understand the fundamental types of nuclear radiation and the effects they have on biological systems
- AA. and demonstrate laboratory skills which include operating an analytical balance; calibrating and/or use fundamental lab equipment such as a thermometer, barometer, buret, pipette; recognizing use and limitations of laboratory glassware; recording and reporting observations; using error analysis techniques to evaluate certainty of data; use safety precautions and general laboratory procedures.

Please be aware of the following rules:

- Tardiness, cell-phone use, leaving early, and sleeping during lecture is considered disruptive behavior and will result in a partial or full absence being recorded. Students will need to sign the sign-in sheet within the first 10 minutes of class.
- Fraudulent behavior during exams is graded with a (0) zero.
- No homework may be handed in after I have gone over it in class. No alternative homework will be given. I will drop the lowest two homework assignments though.
- No extra credit will be given. You need to work consistently from the beginning.
- Please turn your cell phones onto “silent buzzer” mode during lectures so as not to disturb the class. No cell phones or i-pods will be allowed during exams.

**If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.**

## CHEM 3A Fall 2012

Week	Dates	Lectures	Wed Lab
1	Aug 13-15	Intro, Periodic Table 2.2-3 Scientific Notation & Significant Figures 2.6 Dimensional Analysis and Measurements	Safety, Safety Quiz. Diagnostic exam
2	Aug 20-22	3. Matter, Physical and Chemical Changes 4. Atoms, Elements and Ions	Exp 3. Density of liquids and solids
3	Aug 27-29	5. Chemical Nomenclature: Compounds 5. Chemical Nomenclature: Molecules <b>Wed: Exam 1</b>	Exp 1: Properties and changes of matter
	Aug 31	<b>Last Day to drop class (in person) to avoid a "W"</b>	
	Sept 3	<b>Last Day to drop class (on Webadvisor) to avoid a "W"</b>	
4	Sept 3-5	<b>Monday: Labor Day, no class</b> 5.11 and 6.1-6.1 The Mole	Exp 4: Relative masses of Zn and Cu
5	Sept 10-12	6.7-8 Percent Composition and Empirical Formulas 5. Polyatomic Ions and Hydrates	Exp 5: Simplest formula of a compound, MgO
	<b>Sept 14</b>	<b>Last Day to change class to Pass/No Pass grading</b>	
6	Sept 17-19	6. Thermochemistry 6. Calorimetry 7.1-7.4 Balancing Chemical Reactions	<b>Lab Quiz 1 (labs 1, 3 and 4)</b> Exp 6: Percentage of oxygen in potassium chlorate
7	Sept 24-26	7.9-7.10 Types of Reactions 7.7 Net Ionic Equations, Electrolytes	Exp 13: Percent water in hydrates
8	Oct 1-3	<b>Mon: Exam 2</b> 8. Stoichiometry	Exp 7: Percent copper recovery
9	Oct 8-10	8.6 Limiting Reactants and 8.7 Percent Yield 9 Electronic configuration	Exp 2 : Calorimetry experiment
	<b>Oct 12</b>	<b>Last Day to drop class with a "W" (letter grades assigned after this date)</b>	
10	Oct 15-17	9.7, 9.9 and 10.2 Periodic Table Trends 10. Bonding 10.5 Lewis diagrams	<b>Lab Quiz 2 (labs 5,6,7,and 13)</b> Exp 8: Alum production from scrap aluminum
11	Oct 22-24	10.7 Geometry 10.8 Electronegativity, Polar Covalent Bonds and Polar Molecules	<u>Lewis diagrams and molecular models</u>
12	Oct 29-31	<b>Mon: Exam 3</b> 11. Gases 11. Combined Gas law	Exp 9: Production of hydrogen gas
13	Nov 5-7	11. Ideal Gas Law 11. Gas Stoichiometry and Partial Pressure	Exp 14: Molar mass of a volatile gas
14	<b>Nov 12</b>	<b>Veterans Day</b>	
	<b>Nov 14</b>	14. Acids and Bases 14.6 Titrations	Exp 11: Acid base titration lab, mock practical
15	Nov 19-21	13. Solutions, Dilutions 14. pH and pOH	Exp 10: pH lab
	<b>Nov 22 - 23</b>	<b>Thanksgiving Break</b>	
	<b>Nov 22 - 23</b>	<b>No school.</b>	
16	Nov 26-28	12. Liquids, Solids and Intermolecular Forces 15. Chemical Equilibrium	<b>Lab Quiz 3 (everybody) (Labs 2,8,9,14)</b> <b>Lab practical</b> -acid base titration (Half of class)
17	Dec 3-5	17. Radioactivity and Nuclear Chemistry <b>Exam 4</b> and Post-semester diagnostic quiz	<b>Lab practical</b> -acid base titration (Other half of class)
18	<b>Dec 10</b>	<b>Final Exam 5:30-7:30 in PHY82</b>	
		No lab	