

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

### **Summer 2016 Section 71640**

**Lecture MTWTh (8:30-11:50) in PHY 76**

**Lab MTWTh (12:00-3:10) in LFS-C**

**Instructor:** V. Cornel

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

**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, 4th or 5th** Edition. The Mastering Chemistry CD is not needed.

2. Download fill-in notes and the labs off Blackboard

You will need safety glasses (\$5 at hardware store or you may borrow some from me), a labcoat (which you can borrow from me), closed toe shoes, 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 and do your homework. If you wait until the next exam 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 day 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. This summer I will not accept late homework. Absence is not an excuse for not doing your homework as you can send it in with another student, or count those assignments as ones 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 or to check you are doing the questions correctly, and check the answers at the back of the book.

**Last Day to drop for a refund:** Monday May 23

**Last day to add class, or drop class to avoid a "W":** Tuesday, May 24

**Drop Date:** The last day to drop this class is Friday, June 3. After this date a grade will be assigned.

**Final Exam Date:** Thursday, June 16 from 8:30-10:30 in PHY76

**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 course 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. 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. If you ask me for a make-up exam you have to provide a written, verifiable excuse (e.g. from a doctor, not just your boss). The make-up exam will be taken right after your final exam. If you miss a second exam you will get zero for that exam.

**Grading and Exams:** There will be 4 exams covering the material of previous lectures. These 4 exams will be equally weighted and count 65% all together (13% each).

Laboratory (25%):	
Lecture Material (75%):	<b>Exams 65%</b>
	<b>Homework 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.
- Name and draw Lewis diagrams of inorganic and molecular compounds from the formula and vice versa.
- Safely conduct laboratory experiments implementing concepts and principles learned in lecture.

### **Course Objectives:**

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

- 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;
- 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;
- 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 returned it or 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.
- Please use the restroom before coming to an exam. Nobody will be allowed to go to the restroom during an exam.

**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 the Disabled Student Services as soon as possible.**

## CHEM 3A Summer 2016

	<b>Date</b>	<b>Lecture Topic and Chapters in Tro</b>	<b>Lab</b>
Mon	May 23	Syllabus, Periodic Table 2.2 Scientific Notation 2.3 Significant Figures 2.6 Dimensional Analysis & Measurements	Lab Safety, Safety Quiz.
Tues	May 24	3. Matter, Physical and Chemical Changes 4. Atoms, Elements and Ions 5. Chemical Nomenclature: Ionic Compounds	Exp 3. Densities of Liquids and Solids
Wed	May 25	5. Chemical Nomenclature: Molecules 5.11 and 6.1-6.1 The Mole 6.7 Percent Composition	Exp 1. Properties and Changes of Matter
<b>Thur</b>	<b>May 26</b>	<b>Exam 1</b> 6.8 Empirical Formulas	Nomenclature Handout
<b>Mon</b>	<b>May 30</b>	<b>Memorial Day - no classes</b>	
Tues	May 31	6. Thermochemistry 6. Calorimetry 5. Polyatomic ions	Exp 5. Simplest Formula of a Compound
Wed	June 1	7.1-7.4 Balancing Chemical Reactions 7.9-7.10 Types of Reactions 7.7 Net Ionic Equations, electrolytes	<b>Na,K demo</b> Exp 2: Calorimetry
<b>Thurs</b>	<b>June 2</b>	<b>Exam 2</b> 8. Stoichiometry	Exp 7: Percent copper recovery
<b>Fri</b>	<b>June 3</b>	<b>Last day to drop this class to get a "W"</b>	
Mon	June 6	8.6-7 Limiting Reactants and % Yield 9. Hydrates 9 Electronic configuration	Exp 13: Percent water in hydrates
Tues	June 7	9.7, 9.9 and 10.2 Periodic Table Trends 10. Bonding and 10.5 Lewis Diagrams 10.7 Geometry	Lewis Diagrams and Molecular Models (do prelab during lab)
Wed	June 8	10.8 Electronegativity, Polar Covalent Bonds and Polar Molecules 11. Gases 11. Combined Gas law	Exp 8: Alum production from scrap aluminum
<b>Thur</b>	<b>June 9</b>	<b>Exam 3</b> 11. Ideal Gas Law	Exp 9: Production of hydrogen gas (do prelab during lab)
Mon	June 13	11. Gas Stoichiometry and Partial Pressure 12. Liquids, Solids and Intermolecular Forces 13. Solutions, Dilutions	Exp 14: Molar mass of a volatile gas
Tues	June 14	14. Acids and Bases 14.6 Titrations 14. pH and pOH (bring your calculator)	Exp 11: Acid base titration
Wed	June 15	15. Chemical Equilibrium 17. Radioactivity	Making slime
<b>Thur</b>	<b>June 16</b>	<b>Exam 4 8:30-10:30 in PHY76</b>	