Chemistry 30A – Introductory General Chemistry – Spring 2016

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Office Hours: Sat 4:30PM to 5:30PM in A-237A

Class Meeting: 24229 Lecture: Sat 10:00AM - 12:50PM in A-237
24230 Lab: Sat 1:30PM-4:20PM in A-237

Course Description: Chem30A is an introductory, inorganic chemistry course. It requires no previous chemistry experience; however, success in the course does require an adequate background in algebra. The course includes lecture and laboratory components. Expect this 4 credit course to require a minimum of 8 hours of work outside of class, each week.

Requirements:

1) Completed algebra prerequisite Math 201 or 210D
2) Textbook: Fundamentals of General, Organic, and Biological Chemistry, McMurry, Ballantine, Hoeger, & Peterson, 7th Ed. 2013.
3) Lab Manual
4) Scientific Calculator – graphing calculators and cell phones are **not** permitted.

Classroom Rules:

1) No cheating. Read the student handbook.
2) No disruptive behavior, including the distracting use of electronics. You are always welcome to leave the classroom during lecture, provided that you are quiet and avoid blocking the view of other students.
3) Assignments are due the following meeting after assigned. No late work accepted.
4) Please contact me privately if you are feeling the need for an accommodation based on a disability, as available through the Rehabilitation Act of 1973, section 504.
5) Specific lab rules include:
   - Missing more than 3 experiments results in a grade of D or F (not passing).
   - You must follow dress code and wear safety equipment (goggles) to attend lab.
   - You must print and bring your printed worksheet to the lab to attend lab.
   - No food or beverage in the lab… it's a serious OSHA violation!

Student Learning Outcomes:

- Use dimensional analysis to solve quantitative problems and evaluate the results of calculations to make sure they are physically reasonable.
- Clearly explain qualitative chemical concepts and trends.
- Describe, explain, and model chemical and physical processes at the molecular level in order to explain macroscopic properties.
- Perform laboratory techniques correctly using appropriate safety procedures.
- Calculate experimental values from laboratory data and interpret the results.

Withdrawals: It is your responsibility to withdraw from the class in a timely manner if needed.

Schedule: Table 1 (pages 2-3) provides a tentative class schedule. You need to be familiar with the schedule and grading policies (end of page 3) to keep up with this course.

Table 1. Schedule for Spring 2016.

week	date	task	description	materials
1	1/30	lecture I	Chemistry history; syllabus/grading; math skills	ppt slides; pdf
		lecture II	Matter, physical quantities, significant figures	Ch 1.1 – 1.10; ppt slides Ch 1
		dry lab	Policies, safety, check-in; math worksheets.	(*no experiment*)
		homework #1	Metric units, significant figures, scientific notation	pdf
2	2/6	lecture I	Rounding, dimensional analysis, Temp/heat, density	Ch 1.11 – 1.14
		lecture II	Atomic theory & isotopes	Ch 2.1 – 2.3
		lab #1 & #15	Metric measurement / Line emission spectra	Exps #1 & #15
		homework #2	More sig figs, rounding, isotopes, heat capacity	pdf
3	2/13	**PRESIDENT'S WEEKEND – NO CLASS 2/13**		
4	2/20	**QUIZ 1**	**Sig figs/scientific, units, subatomic particles**	**quiz in lecture**
		lecture I	Periodic table and electron configurations	Ch 2.4 – 2.9; ppt slides Ch 2
		lecture II	Ions and ionic bonding	Ch 3.1 – 3.8
		lab #2	Identification of an unknown liquid	Exp #2
		homework #3	Practice Exam #1 (*minus ionic nomenclature*)	pdf
5	2/27	lecture I	Polyatomic ions, ionic nomenclature	Ch 3.9 – 3.11
		lecture II	Review for Exam 1	
		dry lab	Ionic bonding and nomenclature (*work ahead!*)	pdf
		homework #4	More ionic nomenclature problems	pdf
6	3/5	lecture I	**EXAM 1 (Ch 1-3)**	**exam in lecture**
		lecture II	Covalent bonds	Ch 4.1 – 4.5
		lab #3	Paper chromatography	Exp #3
7	3/12	lecture I	Lewis structures and VSEPR (3D molecular shapes)	Ch 4.6 – 4.8
		lecture II	Polarity	Ch 4.9 – 4.11
		dry lab	VSEPR worksheet (*work ahead!)*	pdf
		homework #5	Lewis structures, VSEPR & polarity worksheet	pdf
8	3/19	lecture I	Chemical equations & balancing	Ch 5.1 – 5.3
		lecture II	Types of reactions: precip., neutralization, redox	Ch 5.4 – 5.8
		lab #8	Chemical changes	Exp #8
		homework #6	Complete/net ionic reactions, balancing, redox	pdf
9	3/26	**SPRING BREAK – NO CLASS 3/26**		
10	4/2	**QUIZ 2**	**Precipitation reactions & solubility rules**	**quiz in lecture**
		lecture I	Moles, Avogadro's number, mole-mole stoich.	Ch 6.1 – 6.3
		lecture II	Mass-mass stoichiometry	Ch 6.4 – 6.5
		lab #11	Empirical formula of MgO	Exp #11
		homework #7	Stoichiometry worksheet with limiting reactants	pdf
11	4/9	lecture I	**EXAM 2 (Ch 4-6)**	**exam in lecture**
		lecture II	Energy and heat	Ch 7.1 – 7.3
		lab #9	Double displacement (precipitation) reactions	Exp #9

12	4/16	lecture I	Gibbs free energy (G), reaction rates	Ch 7.4 – 7.6
		lecture II	Equilibrium and the Le Chatlier Principle	Ch 7.7 – 7.9
		lab #7	Specific heat of a metal	Exp #7
		homework #8	Energy and equilibrium worksheet	pdf
13	4/23	lecture I	Gasses	Ch 8.3 – 8.11
		lecture II	Intermolecular Forces (IMFs), liquids, the solid state & nanotechnology	Ch 8.1 – 8.2 and 8.12 – 8.15; ppt slides Ch 8
		lab #12	Waters of hydration	Exp #12
		homework #9	Gas laws and IMFs worksheet	pdf
14	4/30	lecture I	Solutions & solid hydrates	Ch 9.1 – 9.6; ppt slides Ch 9
		lecture II	Concentration, electrolytes & osmosis	Ch 9.7 – 9.13
		lab #24	Finding pH of solutions	Exp #24
		homework #10	Molarity, dilutions, hydrates, osmolarity worksheet	pdf
S15	5/7	lecture I	Acids & bases I	Ch 10.1 – 10.4; ppt slides Ch 10
		lecture II	Acids & bases II	Ch 10.5 – 10.14
		lab #25	Titration of vinegar	Exp #25
		homework #11	Acids, titration, and pH worksheet	pdf
16	5/14	lecture I	**EXAM 3 (Ch 7-10)**	**exam in lecture**
		lecture II	Nuclear chemistry	Ch 11.1 – 11.11
		lab	check-out	(*no experiment*)
		homework #12	Nuclear chemistry worksheet	pdf
17	5/21	**FINAL EXAM – 5/21**		

Grading: Your semester grade is based on a straight average out of 700 possible points. Points for the various Chem30A components are described below. There is no curve, no extra credit, and no late work accepted. Completed assignments are due the next class meeting following the assigned date. Please keep your scores and graded work to compute your grade.

	Exams	3 x 100 points each	300 points
	Cumulative Final Exam		200 points
	Quizzes	2 or more TBD	90 points
	Lab Report Sheets	best 12 (of 13) x 5 points each	60 points
	Lab Practical		25 points
+	Homework Assignments	12 x 2 points each, +1 bonus	25 points
	Total		700 points

The grade breakdown will be as follows:

A: 90-100 % B: 80-89 % C: 70-79 % D: 60-69 % F: < 60 %

Incompletes: An incomplete grade (“I”) will only be given in appropriate cases defined as “incomplete academic work for unforeseeable and justifiable reasons at the end of the term.”

Study tips for success

1) Review the material **before coming to class.** Just **glance through the textbook** paying special attention to the **topics, new vocabulary, figures, tables, and graphs**. Review and **bring any printouts** for the day. This will help to familiarize you with the material.

2) Attend lectures regularly and **take notes**. Much of the material covered in the lecture will not be covered in the textbook. Further, the more you expose yourself to the material, the more likely you are to do well. If you want to succeed in this class, you need to attend lecture and participate in discussions.

3) Ask questions and attend **office hours**. Don't be afraid to ask about something that is unclear. If you are confused, chances are that others are as well. Ask questions before your confusion (and the confusion of those around you) compounds.

4) **Read the material thoroughly**…this time taking notes with a pen and paper. Repetition is critical to learning new material. After exposing yourself to new chemical concepts by reading the text and attending lectures, read again. Write a summary of each section after reading. **When you can summarize the information in your own words, you have probably learned it.**

5) **Work out problems.** You need to successfully work out solutions to problems, in addition to learning the concepts. Keep track of your mistakes, and learn the how to solve the problem using the posted solutions. You can work out additional textbook problems having solutions in the back of the book.

6) Form a study group. **Explaining something to another person is one of the best ways to learn.**

7) **Learn to anticipate exam questions.** Think, talk and write about the concepts. Think about the meaning behind the concepts/numbers in the context of our classroom discussions. Discuss with and explain the material to your peers. Finally, draft written explanations of concepts to mimic an exam!

8) **Relax** and work smarter, not harder! Work in short bursts, several or more days each week. Breathe deeply. Take study breaks. Gradually increase the amount of time that you do study. Get help when you get stuck.