

# Chemistry 101: General Chemistry A

## Fall Semester 2009

**Instructor: Jan Florián**

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Lecture: Tuesday, Thursday, 6:30 PM – 7:45 PM, FH-auditorium  
Discussion: Thursday, 8:00 pm – 8:50 pm, FH-105, 007  
Office Hours: Tue 8:00 – 9:00 PM, We 2:00 – 3:00 PM, Th 9:00 – 9:30 PM

**Prerequisites:** Successful completion of high school chemistry (one year) and high school algebra. Ability to access on-line information using Internet Explorer, Firefox or Safari web browser.

Self-test: Can you do the following?

1. Solve for the variable  $x$ :  $4x - 2 = 14$
2. Solve for the variable  $y$ :  $\log y = 2$
3. Solve for the variables  $A$  and  $B$ , given the following 2 equations:  $A = B + 1$ ,  $2B = A - 3$

**Textbook:** “*Chemistry & Chemical Reactivity*” 6<sup>th</sup>, 7<sup>th</sup>, or 7e<sup>th</sup> edition, by Kotz, Treichel and Weaver.

### Required Materials:

1. “Online Web-based Learning (OWL) Access Code for *Chemistry & Chemical Reactivity*, 7<sup>th</sup> or 7e<sup>th</sup> edition” (buy in Loyola or Beck’s bookstore or online at [www.cengage.com/owl](http://www.cengage.com/owl)).
2. iclicker remote control device for in-class response (buy in Loyola or Beck’s bookstore or online on [iclicker.com](http://iclicker.com) (new) or Ebay (used). Register your iclicker on Blackboard.
3. a non-programmable calculator, capable of scientific notation.

### Recommended Materials:

- “*Chemistry & Chemical Reactivity*” 7<sup>th</sup> edition ebook (can be purchased packaged together with OWL)
- “*GoChemistry*” minivideo lectures for ipod or iphone (these video lectures are included in OWL)
- “*Student’s solution manual*” for your textbook
- “*Molecules*”, P. Atkins; W. H. Freeman and Company, New York 1996.

**Course Overview:** Chemistry 101 is the first semester of a two-semester series in general chemistry. The course describes the internal composition, properties and interaction of the matter that forms human body and surrounding world. We will cover chapters 1 – 9 and 11-13 of the Kotz text; a schedule of lecture topics accompanies this syllabus. Your attendance at lecture and discussion is expected. The correct answers of the exam questions may require knowledge of all information presented in the lecture, discussion, textbook, and OWL. It is recommended that you read (and think about) appropriate chapter of the textbook prior to the lecture covering that chapter, and ask the questions relevant to the covered material during the lecture and the discussion.

**Exams:** Two 75 minute exams and one 120 minute final exam will be given during semester. The final exam is cumulative. Make-up exams will be allowed for excused absences. If the student disagrees with his score for the exam, he must request re-grading within one week from the day he received the graded exam. Significant percentage of exam questions will be similar to those from OWL and Discussion.

**Homeworks:** Homework problems use the Online Web-based Learning (OWL) system. You will need to buy OWL access code and register at <http://www.cengage.com/owl> before accessing the homeworks for the first time. During the registration, enter the ‘General’ course link and then select your textbook, school, and class section (015). Homework assignments will be due every Th at 10:00 AM and will be posted at least one week before their due date. Overdue homeworks will not be accepted.

**Grading scheme:** Your grade will be calculated using your scores from the three exams, homework assignments and activity points. These scores will be weighted as follows: Exams 1, 2 will contribute 25 points each, homeworks 30 points, the final exam 50 points, and in-class participation (iclicker response) 10 points, for a maximum of 140 points. Grades will be assigned according to the following scale:

<b>Earned Points</b>	<b>Letter Grade</b>	<b>Earned points</b>	<b>Letter Grade</b>
>120	A	72 – 79	C
113 – 119	A-	64 – 71	C-
105 – 112	B+	56 – 63	D+
97 – 104	B	47 – 55	D
89 – 96	B-	46 or less	F
80 – 88	C+		

#### **Ethical Considerations:**

*Students will not collaborate on any exams or OWL homeworks, unless permission is granted by the instructor of the course. Only those materials permitted by the instructor may be used to assist in examinations. Students will not represent the work of others as their own. Any student caught cheating during an exam will be reported to the Deans office and will receive zero points for the given exam.*

#### **Tutoring center:**

The Tutoring Center offers free small group tutoring for Loyola students. The groups meet once a week through the end of the semester and are led by a student who has successfully completed study in the course material. To learn more or request tutoring services, visit the Tutoring Center online at [www.luc.edu/tutoring](http://www.luc.edu/tutoring).

#### **Tentative Schedule**

Week 1	Ch 1: OWL, Branches of Chemistry, Matter. Metric System. Conversion of units. Significant figures. Density.
Week 2	Ch 2: Atoms, sub-atomic particles, ions, isotopes, radioactivity, Atomic mass. Avogadro Number. Mole. Periodic table.
Week 3	Ch 3: Molecules. Formulas and names of chemical compounds. Coulomb law. Molar mass. Determining a formula. Acids and bases. Types of chemical reactions.
Week 4	Ch 4: Writing and Balancing Chemical Equations. Reactions. Stoichiometry.
Week 5	Ch 4: Limiting reactant and yield of reaction. Chemical analysis, Electrolytes. Solubility. Precipitation. Net ionic equations.
Week 6	Ch 4: Acid-base reactions. Oxidation-reduction reactions. <b>Exam 1</b>
October 5 and 6	<b>Mid-semester break</b>
Week 7	Ch 4: Solute Concentrations. Molarity. Preparing solutions of given concentration. Titration. pH
Week 8	Ch 5: Energy. Heat. Heat capacity. System and surroundings. Heat flow. Thermodynamics. Enthalpy. State functions. Calorimetry. Enthalpies of formation. Hess law. Enthalpy change for a reaction. Fuels and energy sources.
Week 9	Ch 6: Electromagnetic radiation. Photons. Planck's equation. Atomic spectra. Structure of atoms. Electrons. Matter waves. Quantum mechanics. Schrödinger equation. Probability and wavefunction. Atomic orbitals.
Week 10	Ch 7: Electron spin. Magnetism. Pauli exclusion principle. Electronic structure of atoms and ions.. Periodic table. Atomic and ionic radius. Ionization Energy. Electron affinity.
Week 11	Ch 8: Chemical bond. Covalent and ionic compounds. Lewis structures. Octet rule and its exceptions. Multiple bonds. Resonance. Formal charge. Bond length.
Week 12	Ch 8: Molecular shapes. Molecular geometry. VSEPR model. Molecular polarity. Bond length and energy. <b>Exam 2</b>
Week 13	Ch 9: Bonding theories. Hybridization of atomic orbitals. $\sigma$ and $\pi$ bonds.
Week 14	Ch 11: Gases. Pressure. Ideal-gas law. Avogadro's principle.
November 25 - 29	<b>Thanksgiving break</b>
Week 15	Ch 11&12&13: Gas laws and chemical reactions. Gas mixtures. Kinetic model of gases. Diffusion. Effusion. Real gases. Intermolecular forces. Chemistry of solids. Lattice energy.
December 8	<b>Final Exam, FH-auditorium, 6:30 – 8:30 pm</b>