

# Chemistry 101: General Chemistry A

## Fall Semester 2013

Instructor: Jan Florián

Office: Flanner Hall, room 314B (enter through the room 314A)  
Telephone: 508-3785  
Email: jfloria@luc.edu  
Lecture/Discussion: Tuesday, Thursday, 6:00 PM – 7:45 PM, FH-auditorium  
Office Hours: Tue 8:00 – 9:00 PM, Wedn 2:00 – 3:00 PM

**Prerequisites:** Successful completion of high school chemistry and high school algebra.

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 the Central Science*” 10<sup>th</sup>, 11<sup>th</sup> or 12<sup>th</sup> edition, by Brown, Lemay, Bursten, Murphy and Woodward

### Required Materials:

1. “Mastering Chemistry online learning system for *Chemistry the Central Science, 12<sup>th</sup> edition*” You can buy the Mastering access code online at <http://masteringchemistry.com/site/register/new-students.html> for \$66 (\$110 with eText).
2. A non-programmable calculator, capable of scientific notation.
3. Laptop computer (PC or Mac) with wireless internet for answering Mastering Chemistry questions in the classroom.

### Recommended Materials:

- “*Chemistry the Central Science, 12<sup>th</sup> edition* edition eText (can be purchased packaged together with *Mastering Chemistry*)
- “*Student’s solution manual*” for your textbook

**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 – 11 of Brown’s text; a schedule of lecture topics accompanies this syllabus. Your attendance at lecture and discussion is expected. The correct answers of the quiz and exam questions may require knowledge of all information presented in the lecture, discussion, textbook, and Mastering. 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.

**Homeworks:** Homework problems use the *Mastering Chemistry* online learning system. You will need to buy the access code and register at <http://masteringchemistry.com/site/register/new-students.html> before accessing the homeworks for the first time. During the registration, select your textbook, school (zip code 60626), and the course id **FLORIAN2013**. Homework assignments will be due every Mo, We, Fri at 10:59 PM.

**Exams:** Three 45 minute multiple-choice mid-semester 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 her/his score for the exam, she/he must request re-grading within one week from the day he/she received the graded exam.

**Quizzes:** 12-question multiple-choice or short-answer quiz will be given each week. No make-up quizzes will be allowed.

**Grading scheme:** Your grade will be calculated using grading points that you earned in the four exams, homework assignments, and quizzes: 100% on each mid-semester exam = 18 points, 100% on the final exam = 36 grading points, 100% on the quizz total = 18 points, 100% on the homework problems = 10 points.

Your two weakest quiz results will be disregarded. In addition, your exam with the lowest score (or your total quiz score if it would be lower than the lowest exam score) will be disregarded. Thus, the maximum total number of grading points that you can obtain will be  $3 \times 18 + 36 + 10 = 100$ .

Grades for the class will be assigned according to the following scale

Earned Grading Points	Letter Grade	Earned Grading Points	Letter Grade
86 – 100	A	55 – 60	C
80 – 86	A-	50 – 55	C-
75 – 80	B+	45 – 50	D+
70 – 75	B	40 – 45	D
65 – 70	B-	40 or less	F
60 – 65	C+		

**Midterm grade:** Your midterm grading points will be based on the two mid-semester exam results, quiz total (the lowest quiz will be disregarded) and homeworks that will all carry the same weight (i.e. 25 grading points each). Your midterm grade will be calculated using the same scale as your final grade (see above).

**Ethical Considerations:**

*Students will not collaborate on any exam or quiz. Only those devices and materials permitted by the instructor may be used to assist in examinations or quizzes. Students will not represent the work of others as their own. During the examinations quizzes, students must follow the seating arrangement determined by the instructor. Any student caught cheating during exam, or student who modifies his/her exam after it was returned back to him/her for inspection 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 (exact exam dates and study material for the exams will be announced in class and on Sakai)**

Week 1	Ch 1: Branches of Chemistry, Matter. Metric System. Conversion of units. Significant figures. Density.
Week 2	Ch 2: Atoms, sub-atomic particles, ions, Coulomb law. Isotopes, radioactivity, Atomic mass. Periodic table. Molecules. Formulas and names of chemical compounds.
Week 3	Ch 3: Avogadro Number. Mole. Molar mass. Determining a formula. Writing and Balancing Chemical Equations. Reactions. Stoichiometry. Limiting reactant and yield of reaction.
Week 4	Ch 4: Types of chemical reactions. Precipitation. Net ionic equations. Electrolytes. Solubility. Acid-base reactions. Oxidation-reduction reactions. Chemical analysis. Solute Concentrations. Molarity. Preparing solutions of given concentration. Titration.
Week 5	Ch 5: <b>Exam 1.</b> Energy. System and surroundings. First Law of Thermodynamics. Coulomb law.
Week 6	Ch 5: Enthalpy. Heat. Heat capacity. Heat flow. State functions. Calorimetry. Enthalpies of formation. Hess law. Enthalpy change for a reaction. Fuels and energy sources.
Week 7	Ch 6: <b>Mid-semester break (October 8)</b> Structure of atoms. Electrons. Electromagnetic radiation. Photons. Planck's equation. Atomic spectra.
Week 8	Ch 6: Matter waves. Quantum mechanics. Schrödinger equation. Probability and wavefunction. Atomic orbitals.
Week 9	Ch 7: <b>Exam 2.</b> Electron spin. Magnetism. Pauli exclusion principle. Electronic structure of atoms and ions.
Week 10	Ch 7,8: Periodic table. Atomic and ionic radius. Ionization Energy. Electron affinity. Chemical bond. Covalent and ionic compounds. <b>Last day to drop the class (November 1)</b>
Week 11	Ch 8: Lewis structures. Octet rule and its exceptions. Multiple bonds. Resonance. Formal charge. Bond length. Molecular shapes. Molecular geometry. VSEPR model.
Week 12	Ch 9: Molecular polarity. Bond length and energy. Bonding theories. Hybridization of atomic orbitals. $\sigma$ and $\pi$ bonds. <b>Exam 3 (Thursday).</b>
Week 13	Gases. Pressure. Ideal-gas law. Avogadro's principle. <b>Thanksgiving break (November 20 – 23)</b>
Week 14	Ch 10: Gas laws and chemical reactions. Gas mixtures. Kinetic model of gases. Diffusion. Effusion.
Week 15	Ch 11: Intermolecular forces. Real gases. Liquids. Vapor pressure. Phase diagrams.
Tuesday December 10	<b>Final Exam, FH-133, 6:00 – 8:00 pm</b>