

Chemistry 101: General Chemistry A

Fall Semester 2012

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, Wedn 2:00 – 3:00 PM, Th 9:00 – 9:30 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*” 10th, 11th or 12^e edition, by Brown, Lemay, Bursten, Murphy and Woodward

Required Materials:

1. “Mastering Chemistry online learning system for *Chemistry the Central Science, 12th edition*” (buy online at <http://masteringchemistry.com/site/register/new-students.html>).
2. iclicker remote control device for in-class response (buy in Loyola or Beck’s bookstore or online on iclicker.com (new) or Ebay (used) and register it in class).
3. a non-programmable calculator, capable of scientific notation.

Recommended Materials:

- “*Chemistry the Central Science, 12th edition* edition eText (can be purchased packaged together with *Mastering Chemistry*)
- “*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 – 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 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.

Exams: Three 45 minute multiple-choice 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.

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 FLORIAN2012. Homework assignments will be due every Mo, We, Fri at 10:59 PM and will be posted at least two weeks before their due date.

Grading scheme: Your grade will be calculated using grading points that you earned in the four exams, homework assignments, and during lectures and discussions (i-clicker): 100% on each mid-semester exam = 20 points, 100% on the final exam = 40 grading points, 100% on the i-clicker questions = 10 points, 100% on the homework problems = 10 points

The grading points from your weakest exam or from the combination of i-clicker with homeworks will be either disregarded or –for the final exam - multiplied 0.5. Thus, the maximum total number of grading points that you can obtain will be $40 + 3 \times 20 + 2 \times 10 - 20 = 100$.

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

Earned Grading Points	Letter Grade	Earned Grading Points	Letter Grade
> 86	A	56 – 60	C
80 – 86	A-	52 – 56	C-
75 – 80	B+	48 – 52	D+
70 – 75	B	44 – 48	D
65 – 70	B-	44 or less	F
60 – 65	C+		

Midterm grade: Your midterm grading points will be based on the two mid-semester exam results, Clicker sessions and homeworks, with your lowest score being discarded and the resulting total multiplied by 100/40. (i.e. maximum of $(100/40) \times (2 \times 20 + 2 \times 10 - 20) = 100$ grading points). Your midterm grade will be calculated using the same scale as your final grade (see above). Midterm grades will be posted on Blackboard prior to the class withdrawal date.

Ethical Considerations:

Students will not collaborate on any exams. Students will not collaborate on any iClicker questions unless explicitly permitted by the instructor. Only those materials permitted by the instructor may be used to assist in examinations or iClicker sessions. Students will not represent the work of others as their own. During the examinations and iClicker sessions, students must follow the seating arrangement determined by the instructor. Any student caught cheating during an 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, and an additional five grading point penalty. Any student caught cheating on an iClicker session will receive zero iClicker grading points for the semester.

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.

Tentative Schedule (exact exam dates and material for the exams will be announced in class and on Blackboard)

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.
Week 5	Ch 4: Exam 1. Concentration. Acids and bases. Acid-base reactions.
Week 6	Ch 4: Oxidation-reduction reactions. Chemical analysis. Solute Concentrations. Molarity. Preparing solutions of given concentration. Titration. pH
Week 7	Ch 5: Mid-semester break (October 9) Energy. System and surroundings. First Law of Thermodynamics.
Week 8	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 9	Ch 6: Electromagnetic radiation. Photons. Planck's equation. Atomic spectra. Structure of atoms. Electrons. Coulomb law. Matter waves. Quantum mechanics. Schrödinger equation. Probability and wavefunction. Atomic orbitals. Exam 2.
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. Last day to drop the class (November 2)
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 9: Molecular shapes. Molecular geometry. VSEPR model. Molecular polarity. Bond length and energy. Bonding theories. Hybridization of atomic orbitals. σ and π bonds.
Week 13	Exam 3. Thanksgiving break (November 21 – 24)
Week 14	Ch 10: Gases. Pressure. Ideal-gas law. Avogadro's principle. 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 11	Final Exam, FH-133, 6:30 – 8:30 pm