

Chemistry 101: General Chemistry A

Fall Semester 2011

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 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*” 11th or 12^eth 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 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. Significant percentage of exam questions will be similar to those from Mastering and 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 FLORIANCHEM101FALL2011. 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 = 50 grading points

100% on the i-clicker questions = 20 points 0% = 0 points, and linear interpolation in-between. Note that these points need to be confirmed by exams and may be decreased (see Table 1)

100% on the homework problems = 20 points, 0% = 0 points, and linear interpolation in-between. Note that these points need to be confirmed by exams and may be decreased (see Table 1)

The confirmation or down-scaling of iclicker and homework points will be done according to Table 1.

Table 1: Conversion of the homework of i-clicker % (left column) to grading points. The numbers in the top row represent your total exam % (with your weakest mid-semester exam discarded). The data that fall between the points in this table will be calculated by interpolating.

HW or clicker %/exam%	0.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0	90.0	95.0	100.0	
0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0	0.96	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10.0	1.84	1.9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
15.0	2.64	2.8	2.9	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
20.0	3.35	3.5	3.7	3.8	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
25.0	4	4.2	4.4	4.6	4.8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
30.0	4.57	4.8	5	5.3	5.5	5.8	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
35.0	5.08	5.3	5.6	5.9	6.2	6.4	6.7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
40.0	5.53	5.8	6.1	6.4	6.7	7	7.4	7.7	8	8	8	8	8	8	8	8	8	8	8	8	8	8
45.0	5.93	6.2	6.5	6.9	7.2	7.5	7.9	8.3	8.7	9	9	9	9	9	9	9	9	9	9	9	9	9
50.0	6.28	6.6	6.9	7.3	7.6	8	8.4	8.8	9.2	9.6	10	10	10	10	10	10	10	10	10	10	10	10
55.0	6.59	6.9	7.2	7.6	8	8.4	8.8	9.2	9.7	10	11	11	11	11	11	11	11	11	11	11	11	11
60.0	6.85	7.2	7.5	7.9	8.3	8.7	9.1	9.6	10	11	11	12	12	12	12	12	12	12	12	12	12	12
65.0	7.09	7.4	7.8	8.2	8.6	9	9.4	9.9	10	11	11	12	13	13	13	13	13	13	13	13	13	13
70.0	7.29	7.6	8	8.4	8.8	9.2	9.7	10	11	11	12	12	13	13	14	14	14	14	14	14	14	14
75.0	7.46	7.8	8.2	8.6	9	9.4	9.9	10	11	11	12	13	13	14	14	15	15	15	15	15	15	15
80.0	7.61	8	8.3	8.7	9.1	9.6	10	11	11	12	12	13	13	14	15	15	16	16	16	16	16	16
85.0	7.74	8.1	8.5	8.8	9.3	9.7	10	11	11	12	12	13	14	14	15	16	16	17	17	17	17	17
90.0	7.85	8.2	8.6	9	9.4	9.8	10	11	11	12	12	13	14	14	15	16	17	17	18	18	18	18
95.0	7.94	8.3	8.7	9	9.5	9.9	10	11	11	12	13	13	14	14	15	16	17	17	18	19	19	19
100.0	8.02	8.4	8.7	9.1	9.5	9.9	10	11	11	12	13	13	14	15	15	16	17	18	18	19	20	20

The weakest result (measured by grading points) from your mid-semester exams or i-clicker questions or homework problems will be disregarded. Thus, the maximum sum of grading points that you can obtain from your mid-semester exams, homeworks and i-clicker session will be 80, and maximum grading points per semester will be 80 + 50 = 130 grading points.

Grades for the class will be assigned according to the following scale (Table 2):

Table 2: Conversion of total grading points to letter grades.

Earned Grading Points	Letter Grade	Earned Grading Points	Letter Grade
>100	A	60 – 65	C
90 – 100	A-	56 – 60	C-
83 – 90	B+	51 – 56	D+
76 – 83	B	46 – 51	D
70 – 76	B-	46 or less	F
65 – 70	C+		

Examples:

1/ Student A earns 0% from iClicker and Homeworks, 90% of available points from the three mid-semester exams, and 90% from the final exam. This student will earn 54+46 = 100 grading points and an A grade for the class.

2/ Student B earns 90% from iClicker and Homeworks, and 25% from each exam. This student will earn 9.8 + 9.8 + 27.5 = 47.1 grading points and a D grade.

3/ Student C earns 70% from iClicker, 0% from Homeworks, 60% on each mid-semester exam, and 51% on the final exam. This student will earn 12 points for iClicker (from the Table 1, intersection of the horizontal 70% line and vertical 55% line, 55% = (0.6*40+0.51*50)/90), 36 points for mid-semester exams, and 25.5 points for the final exam for the total of 73.5 grading points and a B- grade.

Midterm grade: Midterm grades will be posted on Blackboard prior to the class withdrawal date (November 4). They will be calculated from the two mid-semester exam results, Clicker sessions and homeworks (i.e. maximum of 80 total points). Your total points will be multiplied by 130/80 and resulting points will be converted to your midterm letter grade using Table 2.

Ethical Considerations:

Students will not collaborate on any exams or iClicker questions. 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, 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 additional five grading point penalty.

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 11) 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.
Week 10	Ch 7: Exam 2. 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 4)
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 23 – 26)
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 13	Final Exam, FH-133, 6:30 – 8:30 pm