

## Chemistry 101-004 – Spring 2014 – Syllabus

**Course:** Chemistry 101, General Chemistry A, 3 Credits: Lecture and discussion

**Prerequisites:** A satisfactory performance on the Loyola math proficiency test, or completion of Math 117 with a grade of C- or better. A student may be withdrawn from the course at any time if the prerequisites have not been satisfied.

**Lecture:** MWF 10:25 -11:15 am Cuneo 109 Section 101-004  
You must also register for and attend one of the accompanying discussion sections:

**Discussion:** Tu 8:30-9:45 am Flanner 105 Section 005  
Tu 10:00-11:15 am Flanner 105 Section 006  
Tu 11:30am-12:45 pm Flanner 105 Section 007

**Textbook:** Chemistry The Central Science, Brown/LeMay/Bursten/Murphy/Woodward, 12<sup>th</sup> edition  
MasteringChemistry online access code for the above text (Required)

**Instructor:** Dr. Sandra Helquist

**Email:** shelquist@luc.edu – put only “Chem 101-004” in subject line to receive a response

**Office:** Flanner Hall 200B

**Office Hours:** Mon 12:00-2:00pm, Tu 1:00-2:45pm, Wed 12:00-2:00pm  
Additional times by appointment or drop-in (see posted schedule outside my door)

### Course Content & Objectives

This course is the first in a two-semester sequence of general chemistry. We will focus on building a conceptual understanding of fundamental chemical principles including properties of atoms, molecules, states of matter, and chemical reactions. Students will learn the language of chemistry and develop their skills in scientific problem solving and critical thinking to build a foundation for further study in chemistry, other sciences and related disciplines.

**IDEA Objectives:** Gaining factual knowledge (terminology, classifications, methods, trends)

Learning fundamental principles, generalizations, or theories

Learning to *apply* course material (to improve thinking, problem solving and decisions)

Gaining a broader understanding and appreciation of intellectual/cultural activity (music, science, literature, etc)

Acquiring an interest in learning more by asking questions and seeking answers

### Course Materials

There is a required Textbook/eText for class and it is your option to purchase a student guide or solutions manual to accompany the text. Additionally, you must register for the MasteringChemistry online homework system ([www.masteringchemistry.com](http://www.masteringchemistry.com)). You will need a scientific calculator for problem solving – only calculators approved for use on the ACT exam are permitted during quizzes/exams – and calculators cannot be shared. Course documents will be posted on Sakai and quiz/exam scores will be posted (check for accuracy) in the Sakai gradebook. The Announcements and Email functions in Sakai will be used regularly to communicate useful information.

### Time Investment

For a first-semester general chemistry course, it is anticipated that the average time required to learn the material in order to achieve a passing grade of C- is 2-3 hours of independent working time outside of class (reading, homework, additional preparation & review) spent by the student for each 1 hour spent in lecture/discussion classes. This time investment is expected on a Daily basis in keeping with the best practices of successful learners, however, the time listed is also an estimate and it is up to each individual student to devote the time necessary to achieve the desired course grade. Studying needs may also vary depending on the prior knowledge of each student.

### Academic Integrity

You are encouraged to study with other students in and out of class, however, anything submitted for an individual grade during or outside of class must represent your own knowledge and understanding of the material. Evidence of cheating (for homework, quiz, or exam) will result in, at a minimum, a “zero” on the item and penalty up to failure of the course, as well as referral to the Dean’s Office. For the full College of Arts and Sciences statement on academic integrity, visit: [http://www.luc.edu/cas/pdfs/CAS\\_Academic\\_Integrity\\_Statement\\_December\\_07.pdf](http://www.luc.edu/cas/pdfs/CAS_Academic_Integrity_Statement_December_07.pdf)

### Disability Accommodations

Students requiring accommodations at the University need to contact the Coordinator of Services for Students with Disabilities. The instructor will provide accommodations after receiving documentation from SSWD and allowance of a reasonable time frame for arrangements (minimally, one week in advance). Accommodations cannot be retroactive. Information is available at: <http://www.luc.edu/sswd/>

## Class Attendance

Vital for your learning: you are responsible for all material presented or handed out, as well as reading and problems recommended in lecture and discussion even if you are not in attendance for a course meeting. Attendance and Attention is important and expected of all students. Prepare for lecture by scanning the new material to be covered. Come prepared to engage in discussion, ready to ask and answer questions on course material -- especially bring questions to discussion classes. If you miss a class for any reason, contact a classmate promptly to get the notes.

## Grading

Your grade for Chemistry 101 will depend on the following factors:

Homework	15%
Quizzes	15%
<u>Exams</u>	<u>70%</u>
Total	100%

Generally, a Total score of 90.0% is the lowest A-, 78.0% the lowest B-, 65.0% the lowest C-, 50.0% the lowest D. Chemistry is not easy to learn, thus the grading policy rewards students for keeping up with the material via completion of homework and group quizzes, as well as two grading options for the exams (see details below). Note that letter grades are assigned based on your Total score, not based on individual assignments, quizzes, or exams.

## Homework

Due 8:00am MWF, online, at <http://www.MasteringChemistry.com>, can be accessed anywhere, on or off campus. MC questions include problems over a range from easy to moderate to difficult-level questions and are meant to: (1) Help you learn the material by practicing it yourself; (2) Serve as an aid to your overall course grade as you make the effort to learn. Additional information on getting started with MC is posted on Sakai. If you struggle with a homework problem, come to office hours promptly for help. Completion of the homework problems is the minimum amount of practice required for learning the course material: most students will need to reinforce their understanding of the material and further develop their problem-solving skills by working end-of-chapter problems from the textbook and/or Study Area in Mastering on a daily basis.

## Quizzes

No early quizzes, no make-ups! *Any missed quiz is scored as a zero.* 15 minutes long, held at the beginning of every discussion. Quizzes include easy to moderate free-response questions and are meant to: (1) Help you evaluate yourself and receive feedback prior to exams; (2) Serve as an aid to your overall course grade if you keep up with the material: your best ten scores will be averaged for your final grade.

## Exams

No early exams, no make-ups! Exams will consist of multiple-choice questions; scoring sheets will be provided by the instructor. Exams comprise 70% of your overall course grade, and will be automatically calculated by the instructor as the higher score between these two options:

Option 1: All 3 midterms, 15% each; final exam, 25%; Total exam score = 70%

Option 2: Best 2 midterms, 15% each; final exam, 40%; Total exam score = 70%

Midterms: 50 minutes, Friday February 7, Wednesday March 12, Monday April 7. If you miss a midterm *for any reason*, Option 2 will automatically be used to determine your grade. A second missed midterm will result in a score of *zero* counted in your course grade. It is in each student's best interest to prepare for and take all exams.

Final: 2 hours, Monday April 28, 9-11 am. *Mandatory: a missed final exam will result in a course grade of F.* The final exam must be taken on the date scheduled per College of Arts and Sciences policy.

## Exam Day Procedure

Phones, tablets, wireless devices, etc are not permitted. If seen or heard, device will be confiscated along with exam copy and student will be dismissed. Seating arrangements may be altered before or during the exam. Show up early with three items: (1) your Loyola ID, visible on desk to be checked during exam; (2) working pencil(s); (3) working approved calculator ([www.actstudent.org/faq/calculator.html](http://www.actstudent.org/faq/calculator.html)), with the memory cleared, to be checked during exam, extra batteries are recommended. All jackets, bags, loose accessories, etc must be left at the front of the classroom. Once the exam is distributed, if you exit the room (quietly, please), for any reason before time is up, your exam is considered complete and will be collected. I will return your midterm exams *during the discussion periods or in office hours* (copies will be kept). Scoring errors must be brought to my attention in person no later than one week after the exams are returned. The final exam cannot be returned.

## Studying Strategies and Suggestions

Students often ask “how do I get an A in this class?” The simple and difficult answer is that grades are earned based on quality of achievement in the course, with an ‘A’ earned by demonstrating complete (not partial) mastery of all (not some/most) of the course material on all exams, quizzes and homework: there are no easy shortcuts to learning!

General Suggestions: There are some things in Chemistry that must simply be memorized, but do not confuse rote memorization with learning a concept. You will often be asked to learn systematic naming conventions, definitions and formulas, as well as important, fundamental constants and equations, so may find it helpful to make notecards or keep lists of important definitions/formulas to quickly master the material as needed to keep pace with the class. Try multiple methods for probing your understanding of the material and ask questions often. You are encouraged to form study groups – talk to your classmates and exchange contact information – and attend office hours and tutoring regularly to receive help. Take advantage of all the resources Loyola offers for support early and often. You are urged to contact the instructor to discuss problems before they become serious.

Step-By-Step Daily Studying Practices aka Learning the Course Material: Because many topics we will cover build heavily on prior material, the best plan is to study chemistry regularly, every day, similar to practicing the piano or training for a competitive sport. Plan to put in 2-3 hours of independent working time for each hour you spend in class. Before each lecture, it is expected that the student will quickly scan the chapter/sections to be covered (sections are generally covered in order throughout the semester), taking note of key definitions, formulas and concepts, in order to improve lecture comprehension. In lecture and discussions, ask and answer questions with the instructor and your classmates. After lectures, detailed re-reading of the textbook is appropriate, along with working the practice exercises contained within the text sections to immediately test comprehension of the material covered. The student is then expected to ask follow-up/clarifying questions as necessary, and to complete the assigned homework problems by the next lecture meeting. Additional rounds of questions for the instructor are appropriate, brought to office hours or discussion classes in particular. Finally, the student should work as many end-of-chapter problems as needed to gain comprehensive understanding of the material, and repeat the process of working problems and asking questions as needed. Each student must practice, practice, practice solving problems on a daily basis to learn the material.

Reviewing for Exams: Top performers on exams will have practiced enough outside of class to get the correct answer the first time through each question. Top performers on exams will also quickly recognize the most efficient method to solve each problem; in other words, problem-solving in chemistry is a skill that can be learned with practice. You should expect to see questions on exams that will require you to apply your knowledge to new problem types (expect the unexpected). Memorization will usually not be sufficient, you must understand why and when each concept is used to demonstrate that you have learned the material. For these reasons, overnight cramming usually will not produce long-term success, in this and future courses. If you have followed the Step-By-Step Daily Studying Practices above, you have already studied for your exams by learning the course material! Begin to review for each test a few days in advance. You may wish to use the Chapter Summary, Key Terms, and Key Skills listed at the end of each chapter as a review tool, or to make your own study guides from lecture outlines or quizzes prior to exams. Find a review method that works for you: meet with classmates and quiz each other, make your own quizzes from the textbook problems and/or Mastering Study Area, bring additional questions to office hours.

Suggestions for Success During the Exams: Follow instructions given on and during each exam. You will lose points for failing to completely fill in your name and a 10-digit ID number, including bubbles, on your answer sheet, and for keeping your exam and/or score sheet after time is called. Only answers that are filled in on the score sheet will be graded.

Familiarize yourself with strategies for answering multiple-choice questions. No partial credit is given, but you will often be able to eliminate some of the answer choices to make an educated guess if you have some knowledge of the material. At the beginning of every exam, look through all of the questions and decide where to begin. Pace yourself: do not spend too much time on any single question and prioritize your time where it will be well spent. If you are stuck at the beginning, middle or end of any question, move on, and before time is called, fill in an answer for every question: there are no penalties for guessing. Do not try to work multistep problems solely in your head or in your calculator as you will not be able to check for and find your mistakes – always write out your work so you can come back to a problem later if you get stuck.

## Tutoring Center

Free tutoring services are offered in Sullivan 245, including tutor-led small groups and walk-in study halls. For more information, see: <http://www.luc.edu/tutoring/>

### Recommended End-Of-Chapter Exercises

From your book: these are to be completed for your own daily practice after you have completed the homework and in-chapter exercises for each topic. Each of the questions listed below is a red-numbered exercise with an answer in the back of the textbook (starting on page A-1). All of the EOC's are worthy of your time, however, if you do not complete all of them, start with these. Work the problems without looking at the solutions manual: your goal is to solve these as if they were exam questions! Bring questions about these problems to office hours and discussion classes. For more practice with a particular topic, work the black-numbered exercises, or unassigned red-numbered exercises as needed.

Chapter 1: 5, 9, 11, 13, 17, 23, 25, 27, 29, 33, 43, 45, 47, 53, 62, 65, 71, 77

Chapter 2: 4, 6, 11, 15, 17, 19, 21, 23, 27, 29, 31, 39, 41, 43, 47, 49, 53, 57, 59, 63, 65, 69, 73, 84, 90, 93, 98, 101, 104

Chapter 3: 1, 3, 5, 7, 11, 13, 17, 19, 23, 27, 29, 31, 33, 39, 43, 47, 51, 53, 57, 61, 63, 67, 69, 71, 75, 77, 81, 83, 85, 89, 93, 101, 105

Chapter 4: 1, 5, 7, 9, 15, 17, 21, 23, 27, 31, 37, 39, 41, 45, 49, 51, 55, 61, 63, 67, 69, 71, 73, 75, 79, 81, 83, 85, 87, 89, 92, 94, 96, 99, 103, 106, 109, 112

Chapter 5: 5, 11, 13, 19, 21, 25, 27, 31, 37, 39, 41, 43, 45, 47, 51, 53, 55, 61, 63, 65, 67, 69, 73, 75, 79, 102, 106

Chapter 6: 2, 5, 8, 11, 13, 15, 17, 23, 27, 31, 33, 35, 39, 43, 45, 49, 51, 53, 55, 59, 63, 67, 69, 71, 73, 75, 85, 90, 94, 97

Chapter 7: 7, 11, 15, 21, 23, 25, 27, 29, 31, 33, 37, 39, 41, 45, 47, 53, 55, 61, 63, 65, 71, 77, 88, 95, 103

Chapter 8: 1, 4, 7, 9, 13, 15, 19, 31, 33, 35, 37, 39, 41, 45, 47, 49, 51, 53, 55, 57, 59, 63, 65, 69, 71, 73, 75, 77, 85, 90, 107

Chapter 9: 1, 3, 5, 6, 11, 13, 15, 19, 21, 23, 25, 27, 29, 31, 37, 39, 41, 43, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 89, 92, 94, 101, 110

Chapter 10: 4, 7, 10, 13, 21, 23, 27, 29, 31, 33, 37, 41, 43, 47, 49, 51, 53, 57, 59, 61, 63, 65, 67, 71, 75, 77, 79, 83, 85, 93, 95, 101, 108, 111, 123

Chapter 11: 1, 5, 6, 7, 11, 15, 17, 19, 21, 23, 25, 27, 29, 33, 35, 39, 41, 45, 47, 51, 53, 55, 57, 59, 61, 63, 73, 77, 82, 90

Chapter 12: 7, 9, 11, 13, 15

**Tentative Lecture Schedule:** Our actual pace may vary: if you miss a class for any reason, get the notes from a classmate!

Week	Dates	Monday	Wednesday	Friday
1	Jan 13, 15, 17	Intro, Measurement, Units, Conversions (Chapter 1)	Conversions, Dimensional Analysis (1)	Molecular Level, Properties of Matter (1)
2	Jan 20, 22, 24	MLK JR DAY	Atoms, Atomic Structure, Isotopes, (2)	Periodic Table, Molecules, Formulas (2)
3	Jan 27, 29, 31	Ions, Ionic Compounds, Naming (2)	Chemical Equations, Reactions (3)	Formulas, The Mole, Molar Mass (3)
4	Feb 3, 5, 7	Calculating Formulas, Stoichiometry (3)	Limiting Reactants, Percent Yield (3)	<b>EXAM I</b>
5	Feb 10, 12, 14	Solutions, Dissolution Process, Electrolytes (4)	Aqueous Solubility, Acids, Bases (4)	Exchange Reactions, Ionic Equations (4)
6	Feb 17, 19, 21	RedOx Reactions (4)	Solution Concentration, Solution Preparation (4)	Solution Stoichiometry, Titrations (4)
7	Feb 24, 26, 28	Energy, Thermodynamics, Heat, Work (5)	Enthalpy, Heat Transfer (5)	Calorimetry, Hess's Law (5)
8	March 3-7	SPRING BREAK		
9	March 10, 12, 14	Formation Enthalpies (5) Energy of Light, Photons (6)	<b>EXAM II</b>	Photons, Quantization, Hydrogen Atom (6)
10	March 17, 19, 21	Matter Waves, Quantum Mechanics (6)	Electrons, Electronic Configurations (6)	Periodic Properties, Trends (7)
11	March 24, 26, 28	Trends, Octet Rule, Bonding (7, 8)	Covalent Bonding, Lewis Structures (8)	Bond Polarity, Lewis Structures, Formal Charges (8)
12	March/April 31, 2, 4	Lewis Structures, Resonance, Bond Strength & Length (8)	VSEPR, Molecular Shapes (9)	Molecular Shapes, Molecular Polarity (9)
13	April 7, 9, 11	<b>EXAM III</b>	Valence Bond Theory, Hybrid Orbitals, $\sigma$ and $\pi$ Bonding (9)	Gas Properties, Gas Laws, Ideal Gas Equation (10)
14	April 14, 16, 18	Gas Law Applications, Gas Mixtures (10)	Kinetic-Molecular Theory of Gases, Liquids, Solids (10, 11)	<b>GOLD FRIDAY</b>
15	April 21, 23, 25	<b>EASTER MONDAY</b>	Intermolecular Forces, Properties of Liquids (11)	Liquids, Phase Diagrams, Solids (11, 12)
<b>Monday April 28, 9-11am FINAL EXAM: Comprehensive</b>				