Chemistry 101-013 – Fall 2015 – 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 A student may be withdrawn from the course at any time if the prerequisites have not been satisfied.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: TuTh 11:30 am – 12:45 pm Section 101-013
You must also register for and attend one of the accompanying discussion sections:
Discussion: F 8:15-9:05 am; 12:35-1:25 pm; 1:40-2:30 pm
Textbook: Chemistry The Central Science, Brown/LeMay/Bursten/Murphy/Woodward, 13th edition
MasteringChemistry online access code for the above text (Required)
Instructor: Dr. Sandra Helquist
Email: Send via Sakai to Instructor (select recipients) and leave subject line blank or from send to shelquist@luc.edu – put only "Chem 101-013" in subject line to receive a response
Office: Flanner Hall 200B (shared office, please knock and wait for a response)
Office Hours: You are welcome to stop by at any time to see if my door is open (see schedule posted outside)
Scheduled office hours (just show up with your questions, no appointment needed):
Tuesdays 10-11am; Wednesdays 1-2:30pm; Thursdays 1-2:30pm; Fridays 9:30-11am

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. This will serve as a foundation for further study in chemistry, other sciences and related disciplines.

- Differentiate types of matter based on their chemical and physical properties (for example, pure substances vs. mixtures, metals vs. nonmetals, ionic vs. covalent vs. metallic, electrolyte vs. nonelectrolyte).
- Use multiple perspectives of matter (macroscopic, particle, symbolic levels) to qualitatively describe and explain characteristics, properties, and relationships of the following: atomic structure, periodicity, molecular structure, chemical bonding, chemical reactions, thermochemistry, aqueous solutions, gases, liquids and solids.
- Quantify relationships between variables controlling chemical systems.
- Solve quantitative multistep problems combining multiple concepts within the systems.
- Differentiate among closely related factors, categorize problem types, and select appropriate tools to solve problems.
- Apply chemical principles to explain natural phenomena.

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

The textbook/eText is required for class (can use textbook copies on reserve at the Library); the student guide and/or solutions manual that accompany the text are optional. Students that choose to use an alternate version of the textbook must do the extra work to align their reading/figures/problems with the current edition. Additionally, web access is required for the MasteringChemistry online homework system and use of Sakai (links/info on sakai.luc.edu and www.masteringchemistry.com). Emails will be sent to the class via Sakai (to your Loyola account). Each student will need a scientific calculator for problem solving – only calculators approved for use on the ACT exam are permitted – all calculator memory must be cleared prior to use on exams. Calculators cannot be shared between students.

Time Investment

For a first-semester general chemistry course, it is anticipated that the average independent working time (outside of class) required to learn the material in order to achieve a minimal passing grade of C- is 1-2 hours per day, every day, not just before exams, of pre-and post-lecture reading, homework, office hours, group study sessions, additional preparation, spent by the student. This time is merely an estimate and it is up to each individual student to devote the time necessary to achieve the desired course grade. Studying needs will also vary depending on the prior knowledge of each student and the difficulty of the course material as the semester progresses.

Classroom Guidelines

To be discussed and set during the first week of class: for the benefit of all students to cultivate a learning environment.

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 Undergraduate Catalog statement on academic integrity, visit: http://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml

Grading

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	15%
Quizzes	15%
Exams	70%
Total score	100%

Homework

Due 11:59pm 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. Each assignment will contain on average, 40-50 minutes of material. Monday assignments will include review material throughout the term. Take your time doing homework problems: they are meant to help you learn, they are not test-specific preparation. Work the problems mindfully, review feedback provided even after you obtain a correct answer, and review any incorrect answers as well to determine why/how you can distinguish from the correct answer. The more you focus on doing the problems to learn from them (rather than doing them simply for completion/class credit), the less time you will need to spend working additional problems later, or trying to cram for exams. 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: most students will need to reinforce knowledge and further develop their problem-solving skills by working end-of-chapter problems daily.

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. Exams comprise 70% of your overall course grade, and will be automatically calculated 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: 55 minutes, September 17, October 20, November 17. 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, Tuesday December 8, 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), 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 exam scoring sheets *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.

Accommodations

Students requiring accommodations must provide appropriate documentation from the University and meet with the instructor to discuss arrangements. Accommodations are provided after receiving documentation and allowance of a reasonable time frame for implementation: minimally, one week in advance of an exam. Accommodations cannot be retroactive. Information for students with disabilities is available at: http://www.luc.edu/sswd/

Best Practices & Suggestions

Students often ask me, "How do I get a/an (fill in grade of choice here) in this class?" The answer is simple (see the grading policy for the course), but the process of learning is challenging and can even be uncomfortable as you are pushed to expand the boundaries of your knowledge and abilities. Grades are earned based on quality of achievement in the course, with the top grade of 'A' earned by demonstrating complete (not partial) mastery of all (not some/most) of the course material on all homework, quizzes and exams: trying to take a shortcut in one area will often be detrimental in another area. So what does it mean to demonstrate mastery of course material? Please refer back to the first page of this syllabus for the overview of Course Content and Objectives: you will be assessed on all of these. My primary concern is to provide you with the tools, environment, and encouragement to learn chemistry, and from there it is up to you to determine your level of achievement. Please continue reading for the best suggestions I have from my own experience as a student and as a teacher, and the experiences of my mentors, colleagues, and former students.

1. Memorization is not sufficient: Understanding the material is essential. There are many ways to state this distinction, for example: you need to know more than the chemistry content, you must understand the chemical concepts. You should already have some experience with this distinction from your previous Chemistry course(s) as well as having learned that simply trying to remember content does not typically lead to sustained learning.
2. Chemistry material, by nature, is highly cumulative. You must have good to excellent understanding of many concepts from Chapters 1-3 in order to build on that knowledge as you begin to learn the rest of the material during the semester. The material we cover in this term will likewise lay the foundation for continued studies in chemistry, biology, and other sciences using this course as a prerequisite. As you continue in these courses, your instructors will refer back to foundational general chemistry concepts and principles incessantly and relentlessly.
3. To deal with the highly cumulative nature of the material, the best plan is to study by working problems every day. Work the required and recommended problems until you can complete them on the first attempt without assistance from your notes, book or the solutions manual. Ask yourself each time: what type of problem is this? Break up your studying, know when you have reached your limit for new content and take a break, give yourself time to process and assimilate before moving on to even more new material. In the academic year, plan on 1-2 hours every day of the week. Falling behind is unacceptable if you wish to fundamentally understand the concepts in order to apply them to solve problems.
4. Foundational concepts, trends and patterns are your friends. If you attempt to memorize everything separately, you will have great difficulty distinguishing problems types and will soon reach your limit of remembering even the basic content. You will be asked to recognize, explain and predict trends in structure, properties and reactivity, so get curious! It is one thing to know what happens, but it is often more satisfying to know why it happens.
5. Even though I recommend that you do not attempt to rely only on memorization, you will still have to remember content. Remembering is a prerequisite for Understanding and Applying, and these two levels of learning will form the basis for your assessment. If you are curious, check out this interactive pyramid depicting Bloom's Taxonomy: http://media.ccconline.org/ccco/FacWiki/TeachingResources/Blooms_Taxonomy_Tutorials/BloomsTaxonomy_Verbs_Pyramid/BloomsTaxonomyVerbsPyramid.swf
As you continue in your undergraduate coursework, the transitions from 100- to 200- to 300-level courses will include transitions to higher-order thinking skills being emphasized for your learning and assessed in your coursework.
6. Form a study group. Learn from and teach your peers.
7. Ask questions. Of yourself, of your classmates, of the instructor.
8. Learn from your mistakes. This is part of critical self-assessment.
9. Take ownership of your learning. It is up to you to determine your level of achievement in this and other courses, and it is up to you to access resources for help as often as needed: office hours, tutoring, study groups, mentoring, and more.
10. Practice, practice, practice. Answer questions and solve problems every day.

If you are solving problems and asking questions on a Daily Basis, 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 is 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. When you are taking any exam, read the instructions and questions carefully, spend your time well on problems you know you can solve, and write out your work so you can check it.

Class Attendance & *Tentative* Lecture Schedule

Class attendance and active participation is vital for your learning and is expected of all students. You are responsible for all material presented or handed out, as well as reading and problems recommended in lecture and discussion. If you miss a class for any reason, contact a classmate promptly to get the notes. I do not provide notes or summaries, but you can always gauge where we are with the material by checking the MasteringChemistry assignments. 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 discussions. Lectures will be presented using "chalk talks" and slides/links/animations. We will not cover every topic in every chapter of the textbook this semester. Focus first on the material that is directly covered in lecture and assigned for homework, quizzes and recommended problems. Explore the additional material in the textbook for your own interest and enrichment.

Week	Dates	Tuesday	Thursday
1	August 25, 27	Introduction, Chemistry, Molecular Level, Properties of Matter, Units (Chapter 1)	Derived Units, Conversions, Dimensional Analysis (Ch. 1)
2	September 1, 3	Atoms, Atomic Structure, Isotopes, Periodic Table (Ch.2)	Molecules, Formulas, Ions, Ionic Compounds, Naming (Ch. 2)
3	September 8, 10	Chemical Equations, Reactions, The Mole (Ch. 3)	Formulas & Molar Mass, Stoichiometry (Ch. 3)
4	September 15, 17	Limiting Reactants, Percent Yield (Ch. 3)	**EXAM I (Chapters 1-3)**
5	September 22, 24	Solutions, Electrolytes, Dissolution Process, Aqueous Solubility (Ch. 4)	Acids and Bases, Exchange Reactions, Net Ionic Equations (Ch.4)
6	Sept, Oct 29, 1	RedOx Reactions (Ch. 4)	Solution Concentration, Solution Prep, Solution Stoichiometry (Ch. 4)
7	October 6, 8	MIDTERM BREAK	Energy, Thermodynamics, Heat, Enthalpy (Ch. 5)
8	October 13, 15	Heat Transfer, Calorimetry, Hess's Law (Ch. 5)	Formation Enthalpies (Ch. 5) Energy of Light, Photons (Ch. 6)
9	October 20, 22	**EXAM II (Chapters 4-6)**	Photons, Quantization, Hydrogen Atom (Ch. 6)
10	October 27, 29	Matter Waves, Quantum Mechanics, Electron Configurations (Ch. 6)	Periodic Properties, Trends (Ch. 7) Octet Rule, Bonding (Ch. 8)
11	November 3, 5	Lewis Structures, Formal Charges, Resonance (Ch. 8)	Lewis Structures, Bond Properties (Ch. 8) VSEPR & Molecular Shapes (Ch. 9)
12	November 10, 12	VSEPR & Molecular Shapes, Molecular Polarity (Ch. 9)	Valence Bond Theory, σ and π bonding (Ch. 9)
13	November 17, 19	**EXAM III (Chapters 6-9)**	Gas Properties, Gas Laws, Ideal Gas Equation and Applications (Ch. 10)
14	November 24, 26	Gas Mixtures, Kinetic-Molecular Theory (Ch. 10)	THANKSGIVING BREAK
15	December 1, 3	Intermolecular Forces, Properties of Liquids (Ch. 11)	Liquids, Phase Diagrams (Ch. 11) Solids (Ch. 12)

Tuesday December 8, 9-11 am
FINAL EXAM Comprehensive: Chapters 1-12

Other Items

A link to the official Loyola calendar can be found here: http://luc.edu/academics/schedules/index.shtml
The Withdraw deadline for the semester is Friday October 30th.
For information about Loyola tutoring in the Sullivan Center, see: http://www.luc.edu/tutoring/
A list of Highly Recommended Textbook problems is posted under Course Materials on Sakai. You also have access to the Study Area in MasteringChemistry which includes extra practice problems.
Best wishes for a successful semester. Let me know what I can do to help you succeed in this course.