

Chemistry 102-001 – Spring 2014 -- Syllabus

- Course:** Chemistry 102, General Chemistry B; 3 Credits: Lecture and discussion
- Prerequisites:** Chemistry 101 or 105 and completion of Math 118 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 A student may be withdrawn from the course at any time if the prerequisites have not been satisfied.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 8:15 - 9:05 am Flanner Hall 133/Auditorium
You must also register for and attend one of the accompanying discussion sections:
- Discussion:**
- | | | | |
|---|-------------------|-------------|-------------|
| F | 11:30am - 12:20pm | Flanner 105 | Section 002 |
| F | 12:35 - 1:25 pm | Flanner 105 | Section 003 |
| F | 1:40 - 2:30 pm | Flanner 105 | Section 004 |
- Textbook:** Chemistry The Central Science, Brown/LeMay/Bursten/Murphy/Woodward, 12th edition
MasteringChemistry online access code for the above text (Required)
- Instructor:** Dr. Sandra Helquist
- Email:** shelquist@luc.edu – put only “Chem 102-001” 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 lecture and discussion course is a continuation of Chemistry 101 and includes topics on solutions, kinetics, equilibrium systems, acids and bases, chemical thermodynamics, electrochemistry, and nuclear chemistry. Building on the basic principles learned in the 101 course, students will deepen their conceptual understanding of specific complex topics in chemistry, and further develop their skills in scientific problem solving for use in higher-level courses 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). You will need a scientific calculator for problem solving – only calculators approved for use on the ACT exam are permitted during 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 second-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 2.5-3.5 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

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: If you miss a class for any reason, contact a classmate promptly to get the notes! Attendance and Attention is important and required. Prepare for each lecture by reading the assigned sections and working the homework assignment. Come to lecture prepared to participate and work with your classmates, ready to ask and answer questions on course material. Come to discussion prepared to work challenging problems in small groups.

Grading

Your grade for Chemistry 102 will depend on the following factors:

Homework	15%
Group Quizzes	10%
<u>Exams</u>	<u>75%</u>
Total	100%

Generally, a Total score of 88.0% is the lowest A-, 75.0% the lowest B-, 60.0% 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 11:59pm the night before each lecture, online, at <http://www.MasteringChemistry.com>, can be accessed anywhere, on or off campus. Assignments will include a message specifying the textbook sections to be read before attempting the problems. MC questions include tutorial-type problems over a range from easy to difficult 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; (3) Inform the instructor of topics that need in-depth attention and further review in lecture. Additional information on getting started/getting help with MC is posted on Sakai. 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.

Group Quizzes

No early quizzes, no make-ups: *any missed quiz is scored as a zero.* Quizzes include exam-level (moderate-to-difficult) long-answer problems and are completed in discussion, in small groups to be announced by the instructor. Work must reflect efforts of ALL group members, and is meant to foster cooperation and communication between students, in addition to consultation with the instructor, to help you learn the material. If you struggle with any part of a question in the group session, get help as needed and keep practicing (studying) until you can work similar and related problems from the textbook on your own. Your overall quiz score is the average of your best ten scores.

Exams

No early exams, no make-ups! Exams will consist of multiple-choice and long-answer questions. Exams comprise 75% of your course grade, and will be automatically calculated by the instructor as the higher score of two options:

Option 1: All 3 midterms, 15% each; final exam, 30%; Total exam score = 75%

Option 2: Best 2 midterms, 15% each; final exam, 45%; Total exam score = 75%

Midterms: 50 minutes, Wednesday February 5, Friday February 28, Monday March 31. 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 May 5, 9-11am. *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 Science 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) pencil(s) or standard blue/black ink pen(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 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!

Taking Ownership of Your Learning: Almost all of you are in Chem 102 because you have taken at least one prerequisite college chemistry course. Most of you have also taken other college courses in science, math, arts, and humanities. By now you should appreciate that the approach you take to learn the material will vary between subject areas and courses. I encourage each of you to take ownership of your learning, such that you will determine, as an individual, what you must do to achieve your desired level of success in this course. The learning skills that you develop in this and other courses at Loyola are meant to help you develop into an independent, lifelong learner.

General Suggestions: Good knowledge of the material from Chem 101 (Chapters 1-11) is assumed and necessary for this course. If you do not remember particular topics, review immediately and seek help as needed. There are some things in Chemistry that must simply be memorized, but do not confuse rote memorization with learning a concept. 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 (www.luc.edu/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 are cumulative and build on prior material, the best plan is to study chemistry regularly, every day, similar to training for a competitive sport or mastering a musical instrument. Plan to put in 2.5-3.5 hours of independent working time for each hour you spend in class. Before each lecture, it is expected that you will read the assigned textbook sections and work the homework online. When you are reading, take note of key definitions, formulas and concepts. Reading and homework problems are assigned before lectures so that each of you can work through the material at your own pace, in order to improve your lecture comprehension, and so that you will be able to contribute to a productive classroom experience. In lecture, ask and answer questions with the instructor and your classmates. After lecture, review the textbook/homework/notes as needed, and work as many textbook problems and/or online problems as you need to be able to solve problems on the first try without your notes or other assistance. Additional rounds of questions for the instructor and classmates are appropriate, brought to office hours, study groups, tutoring, etc to clarify the material. Repeat the process of working problems and asking questions as needed. Reading and note-taking is necessary but is usually not sufficient: 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: Pay attention to instructions and clarifications given for each exam. You will receive a point penalty if you fail to turn in your exam promptly when time is called. Only answers that appear in the indicated spaces will be scored. When you are instructed to begin any exam, take a minute to look through all of the questions. Start with the problems you are confident you can solve immediately. Pace yourself 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. *Multiple-choice questions* test standard definitions, formulas or concepts, or basic calculations. No partial credit, no penalty for guessing. If the concept being tested is well understood, each of these questions should be answered easily in one minute. *Long-answer questions* are similar to your quiz problems, and the most difficult of these will combine multiple concepts/equations. Detailed calculations with all work shown are required, and partial credit may be awarded at the discretion of the instructor. While you must be able to rapidly identify the question being asked and the strategy needed to solve the problem, you may need several minutes to work through the entire solution. Budget your test-taking time accordingly, and prioritize work on questions you know you can solve.

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. 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 work additional problems as necessary to master the material.

Chapter 13: 3, 7, 9, 13, 15, 17, 21, 23, 25, 27, 33, 35, 37, 39, 41, 47, 49, 51, 57, 61, 65, 69, 71, 73, 75, 77, 79, 81, 83, 91, 100, 103, 106

Chapter 14: 1, 9, 12, 16, 17, 19, 25, 27, 29, 31, 33, 37, 39, 41, 43, 45, 49, 53, 57, 59, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 85, 99, 105, 109, 115

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Chapter 16: 1, 3, 13, 14, 15, 17, 19, 21, 23, 25, 29, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 61, 63, 69, 71, 73, 75, 77, 79, 83, 85, 87, 89, 91, 93, 101, 107, 109, 114, 121

Chapter 17: 1, 4, 7, 10, 13, 15, 17, 19, 21, 25, 27, 29, 31, 33, 35, 37, 41, 43, 45, 47, 49, 51, 55, 59, 61, 67, 71, 83, 86, 88, 90, 92, 96, 108

Chapter 19: 1, 4, 7, 10, 11, 15, 17, 23, 25, 27, 31, 33, 37, 41, 43, 47, 49, 53, 55, 57, 59, 61, 63, 67, 69, 71, 77, 79, 81, 85, 91, 100

Chapter 20: 4, 7, 13, 14, 15, 21, 23, 25, 27, 31, 33, 35, 37, 41, 43, 45, 47, 49, 51, 53, 55, 57, 61, 63, 65, 71, 73, 77, 89, 97, 100, 104, 112, 118

Chapter 21: 1, 4, 5, 7, 9, 11, 13, 17, 19, 21, 25, 27, 29, 31, 33, 35, 39, 41, 45, 47, 49, 55, 57, 59, 61, 69, 71, 73, 85

Tentative Lecture Schedule

Our actual pace may vary from this schedule: if you miss a class for any reason, get the notes from a classmate!

Week	Dates	Monday	Wednesday	Friday
1	Jan 13, 15, 17	Introduction, Solution Process (Chapter 13)	Solution Process, Solubility (13)	Solution Concentration (13)
2	Jan 20, 22, 24	MILK JER DAY	Colligative Properties (13)	Reaction Rates, Rate Laws (14)
3	Jan 27, 29, 31	Determining Rate Laws (14)	Integrated Rate Laws, Half-Life (14)	Collision Model, Activation Energy, Arrhenius (14)
4	Feb 3, 5, 7	Reaction Mechanisms (14)	EXAM I	Dynamic Equilibrium, Equilibrium Constant (15)
5	Feb 10, 12, 14	Equilibrium Constants and Concentrations (15)	Reaction Quotient (15)	Le Chatlier's Principle (15)
6	Feb 17, 19, 21	Acids & Bases, Bronsted-Lowry Definition (16)	Relative Acidity & Basicity, pH scale (16)	pH scale, Strong Acid & Base Calculations (16)
7	Feb 24, 26, 28	Weak Acid & Base Equilibria (16)	Weak Acid & Base Equilibria, Salts (16)	EXAM II
8	March 3-7	SPRING BREAK		
9	March 10, 12, 14	Common Ion Effect (17)	Buffer Composition, pH, Buffer Prep (17)	Buffering Action (17)
10	March 17, 19, 21	Acid-Base Titrations, Equivalence Point (17)	Acid-Base Titration Curves, pH, K_a , K_b (17)	Solubility Equilibria (17)
11	March 24, 26, 28	Common Ions & Precipitation (17)	Spontaneous Processes, Entropy (19)	Entropy Changes, Physical & Chemical Processes (19)
12	March/April 31, 2, 4	EXAM III	Gibbs Free Energy (19)	Free Energy & Equilibrium (19)
13	April 7, 9, 11	RedOx Reactions, Half-Reactions (20)	Voltaic Cells, Cell Potential (20)	Oxidizing & Reducing Agents, Free Energy (20)
14	April 14, 16, 18	Nernst, Batteries, Electrolysis (20)	Radioactivity, Nuclear Stability (21)	GOOD FRIDAY
15	April 21, 23, 25	EASTER MONDAY	Nuclear Transmutations, Decay Kinetics (21)	Energy in Nuclear Reactions, Fission (21)
Monday May 5, 9-11am FINAL EXAM: Comprehensive				