

Chemistry 102-001 – Spring 2013 Lecture 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 A student may be withdrawn from the course at any time if the prerequisites have not been satisfied.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 be registered in one of the accompanying discussion sections:
- Discussion:**
- | | | | |
|---|-------------------|-----------|-------------|
| M | 11:30am - 12:20pm | LSB 212 | Section 002 |
| M | 12:35 - 1:25 pm | Cuneo 104 | Section 003 |
| M | 3:50 – 4:40 pm | Cuneo 117 | Section 004 |
- Instructor:** Dr. Sandra Helquist
Email: shelquist@luc.edu – put “Chem 102” in subject line to receive a response
Office: Flanner Hall 200B
Office Hours: Mon 1:45-3:30pm, Tu 11:30am-1:00pm, Wed 9:30-11:15am, Th 1:00-2:15pm
Additional times by appointment or drop-in (see posted schedule outside my door)
- Textbook:** Chemistry The Central Science, Brown/LeMay/Bursten/Murphy/Woodward, 12th edition
MasteringChemistry online access code for the above text (Required)

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.

Course Materials

There is a required textbook 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 & additional information/links posted on Blackboard). You will need the use of a scientific calculator for problem solving: your calculator does not need to graph, but the use of phone/computer calculators will not be permitted during exams and quizzes. Students cannot share calculators during exams, and calculators will never be provided by the instructor. Lectures will be presented as a combination of “chalk talks” and overhead or PowerPoint slides. All handouts from the lecture will be available on Blackboard (blackboard.luc.edu) and scores will be recorded (each student should check these regularly to ensure accuracy) in the Blackboard grade center. The Announcements section of the course page on Blackboard will be used regularly to communicate useful information.

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 required. Prepare for lecture by scanning the new material to be covered. Come prepared to engage in discussion, ready to ask questions on homework or yet unassimilated lecture material -- especially bring questions to discussion classes. If you miss a class for any reason, contact a classmate promptly to get the notes!

Academic Integrity

Research and learning in chemistry relies heavily on collaborative efforts. You are encouraged to study with other students in and out of class, however, anything submitted for an individual grade (homework, quiz, exam) must represent your own knowledge and understanding of the material. Any student caught cheating will receive, at a minimum, a “zero” on the item and penalty up to automatic 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

At times, students with disabilities may wish to avail themselves of the University's ancillary services. Students requiring accommodations at the University need to contact the Coordinator of Services for Students with Disabilities, then provide documents and schedule arrangements with the instructor at the beginning of the term. Information is available at: <http://www.luc.edu/sswd/>

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, 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). Each student will be assigned an estimated midterm grade following the 2nd midterm exam.

Homework

Online, at <http://www.MasteringChemistry.com>, can be accessed anywhere, on or off campus. Assignments are due at 8:00am before each lecture. 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 Blackboard. If you struggle with a homework problem, come to office hours promptly for help. Students expecting the highest exam scores will further develop their understanding of the material and problem-solving skills by working end-of-chapter problems from the textbook 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 given in discussion, in small groups to be announced by the instructor. In some cases, quizzes will be given as take-home assignments and may still be completed in small groups. 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 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, 30%; Total exam score = 75%

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

Midterms: 50 minutes, Wednesday February 6, Friday March 1, Monday April 8. 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*. It is in each student's best interest to prepare for and take all exams.

Final: 2 hours, Monday May 6, 9-11am, **MANDATORY**. The final exam must be taken on the date scheduled or a grade of **F** will automatically result. Comprehensive, with emphasis on selected topics TBA.

Exam Procedures: Phones, computers, wireless devices, etc are not permitted. If seen or heard, device will be confiscated along with exam copy and student will be asked to leave. Come to the exam with your Loyola ID, and leave visible on desk during exam to be checked. All purses, bags, jackets, etc must be left at front of room. 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

Every semester, many students will ask, “how can I get an ‘A’ in the course?” The simple and difficult answer is that grades are assigned based on quality of achievement in the course, with an ‘A’ earned by demonstrating that you have achieved complete (not partial) mastery of all (not some or most) of the course material on all exams, quizzes and homework: there are no easy shortcuts.

Time Investment: For a second-semester general chemistry course, it is anticipated that the minimal time required to learn the material in order to achieve a passing grade of C- is 3 or more hours of independent working time outside of class (reading, homework, additional preparation) spent by the student for each hour spent in lecture/discussion classes. 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. This studying time is expected on a daily and weekly basis in order to learn the material, such that you will require only a couple hours of review, as opposed to several hours of “cramming” prior to exams.

General Suggestions: Good knowledge of the material from Chem 101 (Chapters 1-11 in your text) is assumed and necessary for this course. If you find that you do not remember particular topics, review immediately and seek help as needed. 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. There are some things in any subject that must simply be memorized. Chemistry is no exception. You may find it helpful to make notecards or keep lists of important definitions to quickly master the material as needed to keep pace with the class. You are encouraged to form study groups – talk to the people sitting next to you in lecture or discussion and exchange contact information – and attend office hours and tutoring regularly to receive help. 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: 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. After lecture, 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, discussion classes, tutoring center and/or study groups. 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. Reading your textbook on a regular basis is important to clarify material, assist with homework questions, etc, but reading and note-taking alone will probably not lead to high exam scores. Each student must practice, practice, practice, solving problems on a daily basis to learn the material.

Exam-specific preparation: Experience dictates that positive outcomes (for exam scores and course grades) are directly proportional to working and understanding the assigned and suggested problems on a regular basis. Success will depend on understanding the concepts behind simple and multistep problems, not just doing the math! 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 make your own study guide from lecture outlines or homework. Find a review method that works for you: review with classmates, quiz each other, work extra textbook problems, make your own quizzes from the MasteringChemistry 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. Multiple-choice questions test standard definitions, formulas or concepts, or basic calculations. No partial credit is given on these questions, but you will often be able to eliminate some of the answer choices to make an educated guess if you have even partial knowledge of the material. 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 complete solution.

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 14, 16, 18	Intro, Solution Process (Chapter 13)	Solubility, Solution Concentration (13)	Concentration, Colligative Properties (13)
2	Jan 21, 23, 25	MILK HOLIDAY	Colligative Properties, Reaction Rates (13,14)	Reaction Rates, Rate Laws (14)
3	Jan/Feb 28, 30, 1	Determining Rate Laws (14)	Half-Life, Collision Model (14)	Arrhenius, Activation Energy (14)
4	Feb 4, 6, 8	Reaction Mechanisms (14)	EXAM I	Dynamic Equilibrium, Equilibrium Constant (15)
5	Feb 11, 13, 15	Equilibrium Constants and Concentrations (15)	Reaction Quotient (15)	LeChatlier's Principle (15)
6	Feb 18, 20, 22	Bronsted-Lowry Acids and Bases (16)	Relative Acidity/Basicity, pH Scale (16)	pH Scale, Strong Acid/Base Calculations (16)
7	Feb/Mar 25, 27, 1	Weak Acid/Base Equilibria (16)	Weak Acids/Bases, Salt Solutions (16)	EXAM II
8	March 4-8	SPRING BREAK		
9	March 11, 13, 15	Common Ion Effect (17)	Buffers (17)	Buffers (17)
10	March 18, 20, 22	Acid-Base Titrations (17)	Acid-Base Titrations (17)	Solubility Equilibria (17)
11	March 25, 27, 29	Solubility & Precipitation, Thermodynamics (17, 19)	Spontaneous Processes, Entropy (19)	EASTER HOLIDAY
12	April 1, 3, 5	EASTER HOLIDAY	Entropy, Gibbs Free Energy (19)	Gibbs Free Energy & Equilibrium (19)
13	April 8, 10, 12	EXAM III	Balancing Redox Reactions (20)	Voltaic Cells (20)
14	April 15, 17, 19	Free Energy, Equilibrium, Nernst (20)	Batteries, Fuel Cells, Electrolysis (20)	Radioactivity, Nuclear Stability (21)
15	April 22, 24, 26	Nuclear Transmutations, Decay Kinetics (21)	Energy in Nuclear Reactions, Fission (21)	Additional Topics, Catch-Up

Monday May 6, 9-11am FINAL EXAM: Comprehensive