Chemistry 102-007 – Summer 2015 -- 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 A student may be withdrawn from the course at any time if the prerequisites have not been satisfied.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/Disc: MWF 9:00 – 11:40 am Flanner 133/Auditorium
Instructor: Dr. Sandra Helquist
Email: Put only "Chem 102" in subject line to receive a response (shelquist@luc.edu) or send using Sakai
Office: Flanner Hall 200B
Office Hours: Immediately following class, by appointment, by announcement
Textbook: Chemistry The Central Science, Brown/LeMay/Bursten/Murphy/Woodward/Stoltzfus, 13th edition
MasteringChemistry online access code for the above text (Required)

Course Content & Objectives

Prerequisite knowledge from Chemistry 101 is necessary for in-depth study of topics in Chemistry 102. We will focus on applying a conceptual understanding of fundamental chemical principles. Students will continue to 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.
The material is highly cumulative over two semesters, such that you will be able to do the following:

1. Use multiple perspectives of matter (macroscopic, particle, symbolic levels) to qualitatively describe and explain characteristics, properties, and relationships of the following: solutions, reaction kinetics, equilibria, acids and bases, reaction thermodynamics, electrochemical reactions, nuclear reactions.
2. Quantify relationships between variables controlling chemical systems.
3. Solve quantitative multistep problems combining multiple concepts within the systems.
4. Differentiate among closely related factors, categorize problem types, and select appropriate tools to solve these problems.
5. 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; the student guide and/or solutions manual that accompany the text are optional. Additionally, web access is required for the MasteringChemistry online homework system (links/info on Sakai and www.masteringchemistry.com). If you choose to use an alternate version of the textbook, you must do the extra work to align their reading/figures/problems with the current edition. You should become familiar (if not already) with Sakai at sakai.luc.edu, to be used for announcements, posting of course materials, grades, etc. Scores/grades are never sent by email. Answer keys for in-class assessments will commonly be posted on 2nd floor Flanner display case. Emails to the class will be sent from Sakai, so you must plan to regularly check your luc.edu email account. Each student will need the use of a scientific calculator for problem solving – only calculators approved for use on the ACT exam are permitted, check yours at: www.actstudent.org/faq/calculator.html. Calculators cannot be shared between students.

Expectations

I expect you to come to each class on time and prepared by reading ahead in the book and working the homework problems. I expect you to ask questions as often as possible when you need clarifications and assistance with the material, and I expect you to actively participate with your classmates during class time with the goal of learning the concepts by practice. Missing any class meeting is strongly discouraged. We will take a short, ~5-minute, break during each class meeting. Be courteous: save your electronic messaging for the break or after class. Plan your schedule so you have at least 25 hours per week outside of class time available for reading, working problems, asking questions, i.e, studying & learning the material on a Daily Basis. Some students may require up to 40 hours per week outside of class to keep up with the course. Plan on a few hours every day, i.e., do not count on cramming it all in on the weekends as this is unlikely to lead to real and lasting understanding of the course material.
What can you expect of the instructor? I expect to provide you with support, guidance, and encouragement as we work toward the course objectives listed above, both for the chemistry content, and for the broader IDEA objectives. I enjoy conceptual challenges, problem-solving, and trying to figure out why and how students make mistakes in order to correct misconceptions. Please ask me to provide additional help as needed.

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 must represent your own knowledge and understanding of the material. On in-class quizzes and exams you are expected to obtain information only from your own mind. Any student found to participate in Academic 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 University statement on Academic Integrity, including Academic Cheating (scroll down), visit: http://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml

Grading You will be assessed on the Course Content and Objectives as listed on the first page of this syllabus, and Course Grades will be assigned based on the level of achievement you demonstrate on graded assessments. Your Chemistry 102 grade will depend on the following: Homework 15% + Quizzes 15% + Exams 70% Generally, 88.0% is the lowest A-; 75.0% is the lowest B-; 60.0% is the lowest C-; 50.0% is the lowest D. Cutoffs for plus/minus grades are not published as they will be determined by the overall distribution of course scores.
Homework: The purposes of these assignments are to: (1) help you come prepared to get the most out of our class time by reading the textbook in detail and completing pre-lecture assignments; (2) help you learn the material and identify your mistakes through additional practice post-lecture. Assignments are only available online, at http://www.MasteringChemistry.com. Pre-lecture assignments are due at 11:59pm SuTuTh, with follow-up assignments due 24 hours later (MWF). Full credit toward course grade will be awarded for weighted scores of 90% and above. Take your time doing homework problems: 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* (not just for the points!), 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, ask for help, then attempt additional problems of that type until you can successfully solve these on the first attempt. Completion of the homework is the minimum amount of practice required: most students will need additional practice on a daily basis to achieve a passing course grade.
Quizzes: The purpose of the quizzes is to help you gauge your learning in a low-stakes assessment. Keep up with the material and use the feedback you receive to adjust your daily studying habits. Dates/times of quizzes may or may not be announced in advance: 1-2 per week, will be given in class and/or as take-home activities, with some completed individually and some completed in small groups. The lowest quiz score will be dropped at the end of the term; all remaining quiz scores will be averaged (by percent, so that equal weight is given to each quiz) to obtain the contribution to the course grade. Every missed quiz receives a score of zero – no early quizzes, no make-ups!
Exams: No early exams, no make-ups! A normal class will follow each of the midterm exams. Unexcused absence (traffic, weather, oversleeping, forgetfulness, etc) results in a ZERO. Excused absences require documentation of an unforeseeable emergency situation but will not result in a make-up exam.

- Midterms: 75 minutes, Wednesdays, July 15 and July 29, 20% each toward course grade. Course material is highly cumulative over two semesters: you will be expected to apply Chem 101 concepts throughout Chem 102.
- Final Exam: Friday August 7, 30% of course grade. The final exam is Mandatory and Comprehensive, with emphasis on material covered after 2nd midterm, to be discussed in class.

Exam Procedure: Phones, tablets, wireless devices, unauthorized materials are not permitted on your person, subject to device confiscation and dismissal from exam. Seating arrangements may be altered before or during the exam. Show up early with three items: (1) your Loyola (photo) ID, visible on desk; (2) pencil(s) or standard blue/black ink pen(s); (3) working approved calculator with the memory cleared, extra batteries are recommended. All purses, bags, jackets, etc must be closed and removed from desk/chair and inaccessible during exam. Once the exam is distributed, if you exit the room (quietly, please), for any reason before time is up, your exam is completed. I will return your exams (copies will be kept) for the midterms only. 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/

Additional Information

- A list of highly recommended textbook problems is posted on Sakai in the Course Materials section
- The Center for Tutoring & Academic Excellence generally offers free walk-in tutoring during the summer. Check their website for information: http://www.luc.edu/tutoring/index.shtml
- The Withdraw deadline for the course is Friday July 31st http://luc.edu/academics/schedules/summer/academic_calendar.shtml

Tentative Lecture Schedule & Policy

Introduce yourself to multiple classmates early in the course. Our actual pace may vary from this schedule: if you miss a class for any reason, it is your responsibility to immediately contact a classmate for notes/topics covered, as you are still responsible for all material covered and assigned. Missing even one class is strongly discouraged as it equates to missing an entire week of lecture for an academic year course. I do not provide notes or summaries, but you can always gauge where we are with the material by checking the MasteringChemistry assignments. 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	Monday	Wednesday	Friday
1	June, July 29, 1, 3	Ch. 13: Solution Process, Solubility, Concentration	Ch.13: Concentration, Colligative Properties	JULY 4TH HOLIDAY
2	July 6, 8, 10	Ch. 14: Rates, Rate Laws, Half-Life	Ch. 14: Collision Model, Arrhenius, Mechanisms	Ch. 15: Equilibrium, Constant, Concentrations
3	July 13, 15, 17	Ch. 15 : Reaction Quotient, Le Chatlier	**MIDTERM I** Ch. 16: Acids & Bases	Ch. 16: pH, Weak Acid, Base Equilibria, Salts
4	July 20, 22, 24	Ch. 17: Buffers, Titrations	Ch. 17: Titrations, Solubility Equilibria	Ch. 19: Spontaneous Processes, Entropy
5	July 27, 29, 31	Ch. 19: Gibbs Free Energy & Equilibrium	**MIDTERM II** Ch. 20: Balancing RedOx	Ch. 20: Voltaic Cells, Free Energy, Nernst
6	August 3, 5, 7	Ch. 20: Electrolysis Ch. 21: Nuclear Decay	Ch. 21: Decay Kinetics, Energy, Fission, Fusion	Ch. 21 (leftovers) **FINAL EXAM**

Best Practices

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 1-11 in order to build on that knowledge as you begin to learn the 2nd semester material. 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 summer, plan on 4-6 hours every day of the week. Falling behind in the summer is unacceptable if you wish to successfully complete the course.
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, applying: 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.
10. Practice, practice, practice. Answer questions and solve problems every day.

Best wishes for a successful term. Let me know what I can do to help you succeed in this course.