

# Chemistry 103Lxg Spring 2015

## General Chemistry for the Environment and Life

Course Homepage: <http://chemmac1.usc.edu/103/>

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**Lectures:** 12:00 pm-12:50 pm Monday, Wednesday and Friday in SLH 102  
**Laboratory:** 9:00 am-11:50 am and 3:00 pm-5:50 pm Mondays and Thursdays in SGM 133

**Overview:** Welcome to CHEM 103. This is a one semester, rigorous introductory chemistry lecture and laboratory course that covers important aspects of general, organic and biological chemistry (GOB). While the text and outline is similar to GOB introductory courses taught at other universities, this course is tailored more specifically to Environmental Studies, Neuroscience, and other life science studies at USC. This course is not appropriate for medical school preparation and will not serve as a prerequisite for the organic chemistry course sequence. Students majoring in chemistry, other natural sciences, or engineering will normally register in the CHEM 105ab sequence. Consult your advisor and the instructor immediately if you have questions about CHEM 103 vs. CHEM 105ab.

Environmental Studies and Neuroscience are interdisciplinary fields in which students are required to have a mastery of elements of several traditional disciplines in addition to content and methods specific to their own fields. Students of the environment and neuroscience require a common set of chemistry skills including: basics of organic and inorganic structure and nomenclature, stoichiometry, solution properties, gas laws, non-covalent interactions, kinetics, equilibria, and elementary acid-base and redox reactions. Most importantly, they must have grounding in the chemistry of proteins, nucleic acids and other biological molecules that they will encounter in the complementary course BISC 101 General Biology for the Environment and Life. As Environmental Studies and Neuroscience students will frequently evaluate information related to the concentrations of various substances, it is essential to have some exposure to chemical measurements as well. In a standard chemistry curriculum leading to a BS degree in that subject these topics would be presented over the course of five or more semesters of study. The complementary laboratory features representative exercises from general, organic and analytical chemistry selected to be most appropriate for environmental studies and neuroscience.

### General Learning Outcomes:

- The student must become proficient in the comprehension of technical text. Using a laboratory manual, class handouts and instruction sheets for laboratory equipment meets this goal.
- The student will develop organization skills through transcription or procedural outlines to a personal laboratory notebook.
- Students demonstrate the ability to interpret and analyze quantitative information; apply mathematical principles and techniques; and to use mathematical models to solve applied problems.
- Laboratory reports require tabulation and summarization skills as well as the completion of the Data, Calculations, Results, and Conclusions sections of the laboratory notebook successfully.
- Students demonstrate effective problem-solving and critical thinking skills through interpreting, presenting or evaluating ideas.
- Students apply scientific reasoning and methods of inquiry to explain natural phenomena.
- The experiments chosen give the student a concrete and tactile means of investigating mere abstract theoretical ideas introduced in the lecture.

- The student is encouraged to identify the theoretical sources of procedural error for each experiment. They must identify and analyze these parameters for their effects upon the outcome of the experiment and any conclusions that may be drawn.
- Written evaluations employ both objectives and subjective questions that require the student to apply the newly learned ideas to a similar situation.

**Textbook:** Kenneth W. Raymond, General, Organic, and Biological Chemistry: An Integrated approach, 4<sup>th</sup> Ed., Wiley, 2013, ISBN 978-1-118-35258-8.

William G. O'Neil, Exercises for the General, Organic & Biochemistry Laboratory (customized for University of Southern California. ISBN, 978-1-61731-570-1

**Calculator:** CHEM 103 requires everyone use a non-programmable scientific calculator during exams. The Casio FX-S260 Solar, which is about \$10 is available in the bookstore.

**Other:** Eye protection must be worn in all laboratories whenever any laboratory work is in progress. A lab coat, closed-toe shoes, and long pants must be worn when doing experimental work. Shorts and sandals are NOT allowed in the laboratory. You will not be allowed to participate in the experiment if you are not wearing the appropriate protective clothing.

**SI:** The University has a Supplemental Instruction Program (<http://www.usc.edu/dept/LAS/si/>) that we encourage you to use. The SI instructors hold weekly sessions going over the course material and problems. They also prepare mock exams, which you can use to test yourself before the midterms and finals. The SI leaders attend all of the lectures and are familiar with the lecture material.

**Website:** The course website provides administrative information for both lecture and laboratory. Selected course materials are available online such as lecture slides, exam study material, exam keys, and secured access to your grades. *You must set up a password to access the website using the link in the upper left hand corner of the page.*

**Grading:** Grades will be calculated based on exams, laboratory assignments, in-class assignments and class participation. The distribution will be as follows:

Assignments	10%
Exam 1, 2, & 3	50%
Lab Reports	15%
Final exam	25%
	<hr/>
	100%

To receive a passing grade, satisfactory work must be done in both lab and the lecture portions of the course. **You are encouraged to check your grades on the Chem 103 website.**

**Exams:** There will be three lecture based exam and a final on the following days. The final exam will be given on *Friday, May 6, 2015, 8:00 a.m. – 10:00 a.m.* Although it will be comprehensive, lecture material covered after the third hour exam will be emphasized.

<b>Exam 1</b>	Friday, February 12	Ch 1-4
<b>Exam 2</b>	Wednesday, March 9	Ch 5-6
<b>Exam 3</b>	Wednesday, April 13	Ch. 7-9
<b>Final</b>	Friday, May 6	8 am - 10 am

**Attending Exams:** All three midterm exams begin at 12:00 pm and students will be allowed to enter and take the exam until 12:30 pm. **After 12:30 pm, students will be turned away from the examination.** Likewise students in the exam will not be permitted to leave the exam room until 12:30 pm.

The final exam begins at 8:00 am and students will be allowed to enter and take the exam until 8:30 am. **After 8:30 am, students will be turned away from the examination.** Likewise, students in the exam will not be permitted to leave the exam room until 8:30 am.

**Make-up Exams:** No make-up exams will be given. An unexcused missed hour exam will be considered the one allowed dropped exam. A second unexcused missed hour exam will be counted as a zero. An excused absence from an exam will also be considered the one allowed dropped exam. An excused absence from a second exam will be granted by the instructor only on the basis of proper documentation. For example, a second missed exam because of serious medical reasons will be excused only if a certification is provided by a physician.

All electronic devices such as cell phones are prohibited and cannot be used for any purpose during the exam, including keeping time. No one will be allowed to enter the exam room late or to leave early. Graded exams will be scanned and available for viewing/printing from the class web site via the class password you set up.

**Drop Dates:** Friday, January 29, 2015: Last day to drop without a mark of W.  
**Friday, April 8, 2016:** Last day to drop with a mark of W.

If you drop the lecture, you must also drop the lab. The mark of Incomplete (IN) may only be given to a student who is doing passing work through April 8, 2016 and is unable to complete the assigned work due to serious illness or a documented emergency occurring after April 8, 2016.

**Attendance:** *This is a laboratory course and attendance to all lab periods is mandatory. No make-up labs can be given in this course.* Absences will be excused only for medical reasons or in the case of extreme necessity. Written excuses or student health center slips must be presented to the instructor for approval and should be secured in advance whenever possible. In the case of an excused absence, a grade will be assigned which is based on the average of the student's class rank. Any unexcused absence will result in a grade of zero for that laboratory. The instructor reserves the right to drop any student for excessive absences from laboratory. Students who miss **two or more experiments** will automatically **fail the course regardless of their lecture performance.**

**Homework:** Prior to lecture *read the sections to be covered in advance.* This will make the lectures easier to follow. *All* of the problems interspersed in the text after many sections should be worked *immediately* after reviewing each section. This will provide needed practice and reinforcement. *Work all* of the assigned problems. Homework problems from the book will be assigned regularly (on the course website) but will not be graded. ***Working problems is the single best way to learn chemistry and the more the better. Only by working problems will you be able to test your knowledge of the material and your skill in applying it.*** If you have difficulties with some of the problems, it usually means that your knowledge or ability to apply this knowledge is insufficient. In this case, restudy the material in your notes and your text. If that does not help, seek assistance from your instructor or TA's. *Remember that the exam questions will be of a level of difficulty similar to that of the end of chapter problems and may occasionally be selected from homework problems.*

**Lab Reports:** Lab reports are due at the beginning of your assigned laboratory period one week after each lab is completed. There are nine laboratory assignments worth 15 points each. See laboratory report guidelines for more information on lab reports. Late lab reports will be accepted up to two days late, for a maximum of 10 possible points, after which they will not be accepted for any reason. There are no regrades for lab reports.

**Students with Disabilities:** Any student requesting academic accommodations based on a disability is required to register with DSP, Disability Services and Programs, each semester. A letter of verification for approved accommodations can be obtained from DSP. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

**Academic Conduct:** Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

**Support Systems:** A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html) provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

# Tentative Lecture Schedule Spring 2015

Week 1: Chapter 1 Science and Measurements  
Week 2: Chapter 2 Atoms and Elements  
Week 3: Chapter 3 Compounds  
Week 4: Chapter 4 Introduction to Organic  
Week 5: Chapter 5 Reactions  
Week 6: Chapter 6 Gases, Solutions, Colloids and Suspensions  
Week 7: Chapter 7 Acids, Bases, and Equilibrium  
Week 8: Chapter 8 Organic Reactions 1  
Week 9: Chapter 9 Organic Reactions 2  
Week 10: Chapter 10 Carbohydrates  
Week 11: Chapter 11 Lipids and Membranes  
Week 12: Chapter 12 Peptides, Proteins, Enzymes  
Week 13: Chapter 13 Nucleic Acids  
Week 14: Outlook  
Week 15: Review

## Suggested Homework Problems

Kenneth W. Raymond, General, Organic, and Biological Chemistry: An Integrated approach, 4<sup>th</sup> Ed.

Chapter 1: 31, 33, 35, 39, 43, 45, 47, 49, 51, 53, 57, 59, 63, 65, 67, 71, 79, 81, 83, 89, 91, 93, 95

Chapter 2: 1, 5, 11, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 91, 101, 103, 105, 109, 111

Chapter 3: 1-79 odd

Chapter 4: 3, 9, 11, 13, 19, 23, 31, 33, 37, 39, 45, 49, 51, 57, 59, 63, 65, 69, 71, 75, 83, 85, 87, 89

Chapter 5: 1, 9, 15, 17, 21, 25, 33, 39, 41, 47, 49, 57, 61, 69, 73, 83, 85, 91, 97, 99

Chapter 6: 1, 3, 7, 13, 19, 23, 27, 31, 39, 45, 51, 61, 75, 77, 81, 85, 97, 121, 123, 127, 129

Chapter 7: 1, 3, 5, 7, 9, 19, 25, 35, 39, 43, 45, 51, 59, 65, 67, 71, 73, 81, 85, 95, 99, 101, 103

Chapter 8: 3, 5, 9, 13, 17, 19, 23, 27, 29, 35, 41, 43, 27-55 odd, 59, 63, 65, 71, 75, 79, 81, 89, 95, 99, 107, 111, 115, 117, 121, 123, 125, 135, 139, 143, 149, 155, 159

Chapter 9: 1, 3, 5, 7, 9, 17, 19, 25, 27, 37, 39, 41, 45, 47, 51, 57, 59, 69, 71, 75, 77, 87, 89

Chapter 10: 1, 3, 5, 11, 15, 21, 41, 49, 51, 61, 65, 67, 73, 86, 89, 93

Chapter 11: 1, 9, 19, 23, 29, 31, 33, 37, 51, 53, 59, 65

Chapter 12: 1, 5, 9, 19, 21, 29, 35, 37, 39, 41, 47, 51, 53, 65, 74

Chapter 13: 1, 3, 5, 7, 9, 13, 17, 19, 21, 23, 27, 29, 35, 37, 39, 47, 49, 53, 55, 57, 59, 63, 65, 67, 71, 73 (answer the question for translation *not* transcription), 77, 81, 85, 89, 91