

University of Massachusetts Boston
College of Science and Mathematics

CHEM 103	CHEMICAL PRINCIPLES I Spring, 2006	SYLLABUS
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Instructor	Hannah Sevian, Ph.D. Assistant Professor, Chemistry (CSM) and Science Education (GCOE)
Office Telephone	617-287-7724
E-mail	hannah.sevian@umb.edu
Time and Location of Course	Tues/Thurs 10:00 - 11:15, S/1/006
Office Hours	Tues 11:30 - 12:30, Weds 2:30-3:30
Office Location	Wheatley 4 th floor, room 181

Although I do have set office hours, I encourage you to seek assistance from me at other times as well. Email is the best way to reach me, and I always respond to questions sent by email. If you would like to arrange an appointment outside of office hours, please email me. If you do not have easy access to email and if you are unable to reach me directly by phone, you can also reach me through my administrative assistant at 617-287-7587.

All information concerning this course is available on the course website, which can be linked to from www.chem.umb.edu, and which you should visit frequently.

Course Description

Introduction to the fundamental principles of chemistry including atomic structure, stoichiometry, the periodic table of the elements, chemical bonding, molecular structure, and states of matter based on kinetic theory. Laboratory work presents an introduction to methods of quantitative chemical techniques. This course is intended for majors in any of the sciences, including pre-dental, premedical, and pre-engineering students.

Course Prerequisites

You must have passed Math 115 or have passed the Math Placement Test for Math 130. The reason this course has a strictly enforced mathematics prerequisite is that lack of proficiency with algebraic manipulations is widely recognized as one of the key elements leading to failure in general chemistry. Students who have passed a college course in pre-calculus algebra and analytical geometry (equivalent to our Math 130) or higher mathematics courses (calculus, etc.) are exempt from this requirement. If this work was taken at another university, you may be asked to provide documentation before being signed into the course, unless UMass Boston has accepted your previous courses for transfer credit. Please note that students who have taken a statistics course (e.g., Math 125) but no higher mathematics courses *are not exempt* from this prerequisite. If you have enrolled in this course without having met the math prerequisites, please drop the course.

Required Texts

- Brown, LeMay and Bursten, Chemistry, the Central Science, 10th ed. The book is available in the bookstore as a special bundle that includes online access to the Student Solution Manual to the text.
- American Chemical Society (ACS) General Chemistry Official Study Guide. The final exam in this course will be the official ACS exam for first semester general chemistry.

Other Required Materials

A scientific calculator (capable of calculating logarithms, square roots, non-integer exponents). Bring this with you to every lecture, lab, and discussion section.

Course Structure

There are three components to the course. You must register for all three.

Lecture

The lectures, not the book, constitute the principal source of material for the tests. As often as once a week in class, we will engage in collaborative problem solving, which will count toward your grade. The problems solved will only be presented in class (not in the lecture notes), and several of them or problems like them will appear on the exams. Therefore, it is imperative that you attend lectures, participate in class, and take good notes, and keep up on the reading and homework. In addition to mastering the lecture material, you will occasionally be required to learn material from the book which is not presented in lecture. I will be clear about what material from the book you will be responsible for. Use the book to complement the lectures. Examinations ask you to demonstrate your mastery of the material through both qualitative (concept-based) and quantitative (calculation- or model-based) problems. It is not enough to understand the concepts of chemistry; you must also be able to apply the concepts to solve chemical problems. There is no other way to learn chemistry than to practice it. To master the material, you must do the homework. One of the best ways to prepare for examinations is to try to solve problems like those assigned for homework or similar to problems solved in class.

Discussion

Discussion sections are intended to give you opportunities to deepen your understanding of the material, to explain homework problems, and to prepare you for the exams. Homework is not collected or graded, and worked-out answers are available in your student solutions manual, or on the publisher's website. You need to register to gain access to this site, using the code on the card bundled with your textbook. Although you will not turn in your homework, you should always attempt to do the assignment before attending discussion. Attendance in discussions will be taken, so always attend the section you registered for. You may miss three sessions without penalty, but each subsequent absence will result in a 10-point deduction from the 50 point maximum for discussion. Discussions will begin the week of January 30.

Laboratory

The laboratory is an integral part of chemistry; therefore, you must complete the laboratory satisfactorily. *If you do not complete the laboratory satisfactorily, you will receive an "F" for the course, regardless of your performance on lecture exams.* You will not be entitled to an "INC" under such circumstances. You cannot enroll in this course without the laboratory. However, if you have previously passed this course and are repeating it, or if you have passed a similar laboratory course at another college, discuss with me the possibility of a laboratory exemption *before Thursday, February 2*. An exemption gives you credit for your previous laboratory work but does not require you to attend laboratory this semester. If your previous lab work was from another college, we will need to see evidence that you successfully completed the course, a description of the course to see that it is the usual science majors' introductory course with lab, and a description of the laboratory (e.g., syllabus for the lab, your old graded lab reports) to see that it is mainly quantitative and comparable in content to our laboratory exercises. If you are given an exemption on the basis of laboratory work done elsewhere, I will fabricate a laboratory score for you at the end of the semester that is comparable to scores received by other students who score similarly to you on the exams. ***Important: If you think you may be eligible for a laboratory exemption, you should still attend laboratory sessions for the first week or so, until I have approved your laboratory exemption; then you can stop attending labs.*** Laboratory exemptions are subject to the following departmental policy: "A student dropping the course will receive no laboratory grade and must repeat the entire laboratory when retaking the course at a later time (i.e., no laboratory exemption). A student receiving a grade of F in the course, even if passing the laboratory, must repeat all laboratory experiments when retaking the course."

It is imperative that you arrive on time for laboratory. Students who arrive late will not be admitted to laboratory because important details about experimental procedures and safety are presented at the beginning of the laboratory session. The laboratory schedule and manual are available online at the course website (see p. 1). You must have a paper copy of the experiment with you before entering the lab. You must also work on the *Pre-laboratory Questions* **before** coming to lab. These questions are

important because they familiarize you with the experiment and provide examples of calculations that need to be done. Completing these and understanding them ahead of time will save you significant time during the lab session. All matters concerning laboratory policy and scheduling are handled by Prof. Bela Torok, whose email is bela.torok@umb.edu. Do not contact me if you have a problem regarding the laboratory, since that will only delay your receiving a proper response. Laboratories will begin the week of January 30.

Calculator Policies

Calculators may be used in all aspects of this course, including exams. A simple scientific calculator will suffice for Chem 103, but in Chem 104 you may find it useful to have a more sophisticated calculator, such as the Texas Instruments TI-86 or similar models. However, **during an exam you may not use any calculator or device that is capable of communicating with any other calculator or device.** For example, you may not use Palm Pilots or similar devices during exams. Anyone bringing such a device to an exam will receive a zero for the exam. Be sure you know how to operate your calculator before you have to use it in a test situation. Before arriving to an exam, be sure your calculator is working properly and that it has fresh batteries (if needed) or will work in low light (if solar powered). You may bring a backup calculator to exams, if you like. **Calculator sharing is not allowed during exams.**

Tests and Academic Honesty

Except in highly unusual circumstances, there are no make-up examinations. The dates for the exams are listed at the end of this syllabus and are also posted online in the calendar. Exams will be given during the normal lecture time. If you cannot attend an exam for a legitimate reason (e.g., debilitating illness, death in the immediate family, car accident on the way to the university) you must call me or send an email in advance of the exam or as soon as possible under the circumstances. In cases of real emergency, you *might* be eligible to start the exam late. However, in most cases, since one of the exam scores is dropped, any exam you miss will be the one that is dropped. *Absence without notice and/or legitimate cause will result in a score of zero for the exam.* Make every effort to arrive on time to each exam. If you arrive late, you will not be given extra time. No one arriving late to an exam will be allowed to take the exam after the first paper has been handed in, unless special arrangements have been made in advance. Although your lowest exam score will be dropped in determining your final grade (see Grading Policies below), you are strongly encouraged to take every exam.

During exams you are allowed to have pencils, erasers, and your calculator (with extra batteries, if needed) – nothing else. You may *not* have notes, open books, or scrap paper. You are not allowed to store course information in your calculator to use as an electronic “cheat sheet.” Where indicated, you must show work that leads to the answers you give. This means that the correct answer with no work, or work that does not logically lead to it, receives zero credit. Your work must be your own, with no assistance received from anyone else. You should also take reasonable precautions to ensure that no one copies from you. **Academic dishonesty will not be tolerated and may result in your failing the exam, failing the course, or being expelled from the University, depending on the circumstances.**

The final exam for this course will be the official ACS exam for this year for the first year of general chemistry. This is the only exam in this course that will be scaled. The exam is taken nationwide and is normed at approximately 50%, which means that if you receive a 50% on the ACS exam, that will correspond to a 75 out of 100 points (or 150 out of 200 points) for the final exam for our course.

Grading Policies

Grades are based on the following sum of points:

	<u>Points possible</u>
Best two of three in-class exams (100 points each)	200
Comprehensive final exam (official ACS exam)	200
Collaborative problem-solving (in class)	50
Laboratory work	150
Discussion attendance	50
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Total points possible:	650

The course is not graded on a curve. No exams except the final exam are curved. Grades will be based on the following percentages (rounded to the nearest integer percentage point):

Percentage range	Grade range
90-100	A
80-89	B
70-79	C
60-69	D
0-59	F

No student receiving less than 60% of the possible points should expect a passing grade. Grades of INC (incomplete) will only be awarded if (a) a student is passing the course, *and* (b) the reason the student cannot complete the course is beyond the student's control.

Accommodations

Section 504 and the Americans with Disabilities Act of 1990 offers guidelines for curriculum modifications and adaptations for students with documented disabilities. If applicable, students may obtain adaptation recommendations from the Ross Center (617-287-7430). The student must present these recommendations to and discuss them with each professor within a reasonable period, preferably by the end of the Drop/Add period.

[Students are required to adhere to the Code of Student Conduct, including requirements for academic honesty, delineated in the University of Massachusetts Boston Graduate Studies Bulletin, Undergraduate Catalog, and relevant program student handbook(s).]

This syllabus is subject to change. Instructions given in class supercede syllabus content.

Homework

We will cover chapters 1 through 9 in Brown, LeMay and Bursten, *Chemistry, the Central Science*, 10th ed. Please see the "Assignments" section of the course website for detailed weekly reading and homework assignments. Be sure also to download and print out the Course Calendar and other relevant postings under the "Information" section on the website. Sample exams, reference tables, examples of problem solving strategies, and other useful information are also posted on the website.

Detailed reading and homework assignments are posted each week on the course website. www.chem.umb.edu

Examination Schedule

Exam	Chapters Covered (approximation)	Date
Test 1	1-3	Thursday, February 23
Test 2	4-5	Thursday, March 30
Test 3	6-7 and part of 8	Thursday, April 27
Final Exam	1-9	As officially scheduled

- - - Course Calendar starts on the next page - - -

**Chem 103 – Section 1
Course Calendar
Spring, 2006**

Discussion numbers correspond to homework assignments. That is, Assignment 1 will be discussed at Discussion 1, etc. Discussion sections are:

Tu 11:30 in S/2/63

Th 11:30 in S/2/63

Fr 1:30 in S/2/63

Lab sections are:

Tu 1:00-4:00


W 1:30-4:30

Th 1:00-4:00

[Pink font indicates chapters that are covered at lecture.]

Week of Monday the...	Tuesday (lecture, disc & lab)	Wednesday (lab)	Thursday (lecture, disc & lab)	Friday (disc)
1/23	1/24 <i>First day of class</i> No discussion or lab [ch. 1]	1/25 No lab	1/26 Optional discussion section (how to study for this course) [ch. 1]	1/27 Optional discussion section (how to study for this course)
1/30 Lab 1 this week is Measurement of length and volume	1/31 Lab 1 and Discussion 1 <i>Add/drop ends</i> [ch. 2]	2/1 Lab 1	2/2 Lab 1 and Discussion 1 [ch. 2]	2/3 Discussion 1
2/6 Lab 2 this week is Measurement of mass and density	2/7 Lab 2 and Discussion 2 [ch. 2]	2/8 Lab 2	2/9 Lab 2 and Discussion 2 [ch. 3]	2/10 Discussion 2
2/13 Lab 3 this week is Reactions of copper	2/14 Lab 3 and Discussion 3 [ch. 3]	2/15 Lab 3	2/16 Lab 3 and Discussion 3 [ch. 3]	2/17 Discussion 3

Week of Monday the...	Tuesday (lecture, disc & lab)	Wednesday (lab)	Thursday (lecture, disc & lab)	Friday (disc)
2/20 No labs this week President's Day (holiday)	2/21 Discussion 4 No lab [ch. 4]	2/22 No lab	2/23 Exam 1 in class No lab Discussion 4	2/24 Discussion 4
2/27 Lab 4 this week is Stoichiometry	2/28 Lab 4 and Discussion 5 [ch. 4]	3/1 Lab 4	3/2 Lab 4 and Discussion 5 [ch. 4]	3/3 Discussion 5
3/6 Lab 5 this week is Concentrations	3/7 Lab 5 and Discussion 6 [ch. 4]	3/8 Lab 5	3/9 Lab 5 and Discussion 6 [ch. 5]	3/10 Discussion 6
3/13 ←	3/14 —————	3/15	3/16 —————	3/17 →
	SPRING VACATION			
3/20 Lab 6 this week is Heats of reaction	3/21 Lab 6 and Discussion 7 [ch. 5]	3/22 Lab 6	3/23 Lab 6 and Discussion 7 [ch. 5]	3/24 Discussion 7
3/27 No labs this week	3/28 No lab Discussion 8 [ch. 6]	3/29 No lab	3/30 Exam 2 in class No lab Discussion 8	3/31 Discussion 8
4/3 Lab 7 this week is Five unlabeled bottles	4/4 Lab 7 and Discussion 9 [ch. 6]	4/5 Lab 7	4/6 Lab 7 and Discussion 9 [ch. 6] Pass/Fail Deadline Course Withdraw Deadline	4/7 Discussion 9
4/10 Lab 8 this week is Atomic spectra	4/11 Lab 8 and Discussion 10 [ch. 7]	4/12 Lab 8	4/13 Lab 8 and Discussion 10 [ch. 7]	4/14 Discussion 10

Week of Monday the...	Tuesday (lecture, disc & lab)	Wednesday (lab)	Thursday (lecture, disc & lab)	Friday (disc)
4/17 Patriot's Day (holiday) No labs this week	4/18 No lab Discussion 11 [ch. 8]	4/19 No lab	4/20 No lab Discussion 11 [ch. 8]	4/21 Discussion 11
4/24 Fall 06 Registration Begins Lab 9 this week is Volumetric iron analysis	4/25 Lab 9 and Discussion 12 [ch. 8]	4/26 Lab 9	4/27 Exam 3 in class Lab 9 and Discussion 12	4/28 Discussion 12
5/1 Lab 10 this week is Molecular shapes	5/2 Lab 10 and Discussion 13 [ch. 9]	5/3 Lab 10	5/4 Lab 10 and Discussion 13 [ch. 9]	5/5 Discussion 13
5/8 No labs this week	5/9 Optional review session at discussion time [finish ch. 9 and review]	5/10 Classes End	5/11 <i>Study period</i>	5/12 <i>Study period</i>
5/15	5/16	5/17	5/18	5/19
 ← FINAL EXAM PERIOD →				