

University of Massachusetts Boston
College of Science and Mathematics

CHEM 116 (Replaces Chem 104)	CHEMICAL PRINCIPLES II Fall, 2006	SYLLABUS
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Instructor	Hannah Sevian, Ph.D., physical chemistry Associate Professor, Chemistry (CSM) and Science Education (GCE)
Office Telephone	617-287-7724
E-mail	hannah.sevian@umb.edu
Time and Location of Course	Tu/Th 2:30 - 3:45, S/1/006
Office Hours	Tu/Th 1:00-2:00, and other times by appointment
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 acid-base systems, elementary thermodynamics, chemical kinetics and equilibria, electrochemistry, oxidation-reduction reactions, and a survey of the chemical properties of elements based on principles already introduced. Laboratory work presents qualitative and quantitative analysis. This course is intended for majors in any of the sciences, including pre-dental, pre-medical, and pre-engineering students. Note: The Chem 116 (lecture + discussion)/Chem 118 (lab) is a new numbering system that replaces the Chem 104 course (which was lecture + discussion + lab).

Course Prerequisites

Successful completion of Chem 103.

Required Texts

- Brown, LeMay & 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.
- Eubanks & Eubanks, ACS General Chemistry Exam Official Study Guide. Available at the bookstore.

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 two components to the 116 course: lecture and discussion. You are required to co-register for the lab (Chem 118), unless you have received advance permission due to having taken it already.

Lecture

The lectures, not the book, constitute the principal source of material for the tests. The lecture slides that I will use in class are available for printout on the course website, under "Lectures." Students often find it useful to have these on hand during the lectures. However, these lecture slides are not a substitute for what is covered in lecture – they are often graphics with no words to assist in illustrating points we will discuss in lecture. Also, worked-out examples of problems occur during lecture, and the problems are posed but solutions are not usually posted in the lecture slides. 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 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, some of which come from the text book or from the ACS exam study guide.

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 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 assignments 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 September 12. In keeping with a policy established in Chem 103, if you are easily able to complete a homework assignment and do not have any questions, you will be allowed to receive credit for attending discussion **if you arrive to your regularly scheduled discussion section five minutes prior to the beginning and show the discussion instructor your completed homework.** The discussion instructor will check one or two problems on the homework, and if they are correct, you will be given the option of signing in and receiving credit for that discussion section but you do not have to attend it. For the sake of the students who attend the discussion, the instructor will begin discussion promptly at the scheduled start time, and will not permit this option after discussion begins.

Laboratory

The laboratory schedule and instructions for the individual experiments are available from the website under the heading "Laboratory."

Calculator Policies

Calculators may be used in all aspects of this course, including exams. A simple scientific calculator sufficed for Chem 103 (first semester course), but in Chem 116 (second semester course) 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 using such a device on 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. There are three mid-term exams in the course, and one of them is dropped when calculating the course grade. If you are unable to attend one of the exams, this will most likely be the exam that is dropped. If you are tardy for an exam for a legitimate reason (e.g., 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. *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, except in special circumstances. **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 bring your own scrap paper to the exam; scrap paper will be provided at the exam. 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.**

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	200
Collaborative problem-solving (in class)	50
Discussion attendance	50
Total points possible:	500

The course is not graded on a curve. Grades will be based on the following percentages (rounded to the nearest integer percentage point):

<u>Percentage range</u>	<u>Grade range</u>
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, with the following exception: any student who receives 60% or better on the final examination will receive a grade of at least D-. 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 10 through 21, excluding chapter 18, in the text. 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	10-12	Tuesday, October 3
Test 2	13, 14, 21	Thursday, October 26
Test 3	16, 17, 20	Tuesday, November 21
Final Exam	19 and all the other chapters as well	As officially scheduled

Summary of course calendar on next page.

Order of Topics Covered and Corresponding Sections in Text

I intend to cover the following topics associated with the chapters and sections listed below from the Brown, LeMay & Bursten, 10th ed. text. The lectures, not the book, constitute the principal source of material for the tests. Use the book to complement the lectures. See section on Lectures on p. 2 of this syllabus for more information on this.

Topic	Chapters & Sections in Brown et al.
Gases	Chapter 10 (all sections)
Intermolecular forces, liquids and solids	Chapter 11 (omit section 11.7)
Modern materials	Chapter 12 (sections 12.1, 2, 3 and 4)
Properties of solutions	Chapter 13 (omit section 13.6)
Chemical kinetics: rates & mechanisms	Chapter 14 (all sections)
Nuclear chemistry	Chapter 21 (sections 21.1, 2, 3 and 4)
Chemical equilibrium: general	Chapter 15 (all sections)
Acid-base equilibria	Chapter 16 (omit section 16.11) and Chapter 17 (sections 17.1, 2, 3 and 4)
Electrochemistry	Chapter 20 (omit sections 20.7 and 20.8)
Chemical thermodynamics	Chapter 19 (all sections)


Chem 116 – Section 1
Course Calendar
Fall, 2006

Lecture meets every Tu/Th 2:30-3:45pm, in S/1/06, and is not noted on this schedule

Discussion sections meet either Tu 1:00 (section 1) or Th 1:00 (section 2) in S/2/65

Labs meet either M 12:30-4:30 (section 1) or W 12:30-4:30 (section 2), room TBA

Monday	Tuesday	Wednesday	Thursday	Friday
9/4 Labor Day (holiday)	9/5 <i>First day of class</i> No discussion Gases (ch. 10)	9/6 No lab	9/7 Optional discussion section (mostly math review) Gases (ch. 10)	9/8
9/11 Lab 1	9/12 Discussion 1 <i>Add/drop ends</i> Gases (ch. 10)	9/13 Lab 1	9/14 Discussion 1 IM forces (ch. 11)	9/15
9/18 Lab 2	9/19 Discussion 2 IM forces (ch. 11)	9/20 Lab 2	9/21 Discussion 2 IM forces (ch. 11)	9/22
9/25 Lab 3	9/26 Discussion 3 Modern materials (ch. 12)	9/27 Lab 3	9/28 Discussion 3 Solutions (ch. 13)	9/29
10/2 Lab 4	10/3 Exam 1 in class Discussion 4	10/4 Lab 4	10/5 Discussion 4 Solutions (ch. 13)	10/6
10/9 Columbus Day (holiday)	10/10 Discussion 5 Solutions (ch. 13)	10/11 No lab	10/12 Discussion 5 Kinetics (ch. 14)	10/13
10/16 Lab 5	10/17 Discussion 6 Kinetics (ch. 14)	10/18 Lab 5	10/19 Discussion 6 Kinetics and Nuclear chem (ch. 14 & 21)	10/20
10/23 Lab 6 <i>Mid-semester</i>	10/24 Discussion 7 Equilibrium (ch. 15)	10/25 Lab 6	10/26 Exam 2 in class Discussion 7	10/27
10/30 No lab	10/31 Discussion 8 Equilibrium (ch. 15)	11/1 No lab	11/2 Discussion 8 A-B equil. (ch. 16)	11/3
11/6 Lab 7	11/7 Discussion 9 A-B equilibria (ch. 16)	11/8 Lab 7	11/9 Discussion 9 A-B equilibria (ch. 16)	11/10
11/13 Lab 8	11/14 Discussion 10 More equilibria (ch. 17)	11/15 Lab 8	11/16 Discussion 10 More equilibria (ch. 17)	11/17

Monday	Tuesday	Wednesday	Thursday	Friday
11/20 No lab	11/21 Exam 3 in class No discussion	11/22 No lab	11/23 Thanksgiving recess	11/24 Thanksgiving recess
11/27 Lab 9 <i>Spring 06 registration begins</i>	11/28 Discussion 11 More equilibria (ch. 17)	11/29 Lab 9	11/30 Discussion 11 Electrochem (ch. 20)	12/1
12/4 Lab 10	12/5 Discussion 12 Electrochem (ch. 20)	12/6 Lab 10	12/7 Discussion 12 Thermo (ch. 19)	12/8
12/11 No lab	12/12 Optional review session at discussion time Thermo (ch. 19)	12/13 No lab Last day of UMass classes	12/14 Study period	12/15 Study period
12/18	12/19	12/20	12/21	12/22
 ← FINAL EXAM PERIOD →				