

Preliminary Syllabus - Chemistry 11A, General Chemistry, Fall 2007

PLEASE READ THIS SYLLABUS CAREFULLY.

It contains a great deal of useful information that you will be expected to be familiar with. Additional copies can be downloaded via [Latte](#) (see below).

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Office hours: Tu 2:00-3:00, W 11:00-12:00

Meeting times:

Lectures: Section 1, Mon., Wed., Thurs., 9:10-10:00 AM, Gerstenzang 123

Section 2, Mon., Wed., Thurs., 10:10-11:00 AM, Gerstenzang 123

Recitation: Mon., Tues., Wed., Thurs., 4:00-5:00 PM, Kosow 116

Exams (and one make-up lecture): Wed., 6:40-8:00 PM, Gerstenzang 123

Course objectives:

Obviously, part of the goal of this course is for you to learn the subject matter: atoms and molecules, bonding, equilibrium, ... I hope, however, that you will get more than that out of this course. In particular, you should come away with at least some appreciation of how scientists think, and you should be better at problem solving and critical thinking than you were before you took this course. If we are successful in achieving these goals, what you learn in this course will serve you well in many realms – future courses (organic chemistry and biology just to name a couple), potential careers, and the many, many areas of everyday life in which a little scientific knowledge or analytical thinking can go a long way.

Books:

The text for the course *General Chemistry*, 4th edition, by Hill, Petrucci, McCreary and Perry (to be referred to as HPMP). The bookstore has a custom version that contains only the chapters covered in CHEM 11A and B. The full version of the book is available at other bookstores and online. Either is acceptable. There are many, many general chemistry textbooks on the market, each with its own style. Depending on your learning style, you may profit by referring occasionally, or frequently, to one of them. The Gerstenzang Science Library has a large selection of these texts under call number QD31.2. You can borrow them for several weeks. If HPMP's approach doesn't appeal to you, one of the others might. I have put two, *Chemistry* by Chang, and *Chemistry* by Zumdahl, on reserve in the science library (short term borrowing only), but the ones in the stacks are available for longer term loan. Since they all cover the same topics we do, though perhaps in a different order, if you find one you like better than HPMP, feel free to use it.

Attendance:

Attendance at lectures (and recitations) is optional, but **strongly** encouraged. Quizzes will be held in class (see class schedule and information about makeups). All three hour exams will be held in the evening in order to allow you as much as 90 minutes to complete the exam. While the occasional student may be able to succeed in the course without attending regularly, experience suggests that such students are rare. Class will start promptly at the announced time, i.e., 10 minutes after the hour. Please be courteous to your fellow students by taking your seat promptly and concluding your conversations in time for class to start.

Problem Sets:

Problems will be assigned to go along with the readings for each chapter of the book (see “Class Schedule and Assignments”). The assigned problems are meant to give you a good overview of the material covered. You do not need to hand them in, but **it would be a serious mistake not to do them**. Solving problems is the way you learn the material and the way you find out if you *really* understand what you’ve read and heard in class. There will be a lot of problems assigned – typically 10-15 per week. Feel free to consult with your classmates (see next item) and to look at the problems that are not assigned (the book typically has about 100 per chapter), but whatever else you do, **do lots of problems**.

Quizzes

There will be a short (~ 10 minute) quiz nearly every week. Quizzes are announced beforehand (see “Class Schedule and Assignments”), and will be based on one of the homework problems assigned for a previous lecture. The purposes of the quizzes are a) to provide you with feedback on how well you are understanding the material, b) to give you an incentive to keep up with the homework assignments, c) to furnish me with information about your progress in the course. As indicated below (see “Makeups” and “Grading”), the quizzes will contribute to your grade in the course, but I will discard your two lowest quiz grades, or you may miss two quizzes without penalty.

Study groups:

The vast majority of modern scientific research is done by groups of individuals working together. While mastering general chemistry requires a great deal of individual effort, it need not be a strictly solo endeavor, and many students find it helpful to work with others on problem sets, quiz and exam preparation, and in trying to understand difficult concepts. I encourage you to get together with your classmates and form study groups. If you would like assistance in doing so, please send me an email or speak to me after class, and I will connect you with others who would like to participate in a group.

Exams

The three “hour” exams are scheduled during the evening recitation period so that you can have somewhat more than 60 minutes to complete them. The 3-hour final will be held **at a time to be announced shortly**. **Please avoid making any travel plans that might conflict with this time**. You should bring a calculator and may also bring one 8 1/2” x 11” sheet of notes (you may write on both sides) to the hour exams (only calculators, no notes for quizzes). For the final, you may bring two sheets of notes (and your calculator). Please make sure your calculator is charged before the exam. I generally do not have spares to provide. **No collaboration** is permitted on exams or quizzes

Makeups:

There will be no makeups for quizzes for any reason (don't even ask!). Because I will drop the lowest two quiz grades, you may miss (or do badly on) two quizzes without penalty. Makeups for hour exams and finals will be given only for documented medical or other compelling reasons. Makeups are generally harder than the regular exams.

Grading:

Grades in the course will be based on the following components. I will drop the lowest two quiz grades.

| | |
|--|-------------------|
| 10 highest quiz grades (@ 5 points each) | 50 points |
| 3 hour exams (@ 100 points each) | 300 points |
| Final exam | <u>200 points</u> |
| Total | 550 points |

In an effort to reduce anxiety about grades, I will also employ the following procedures to increase all students' chances of doing well in the course.

- a) "Competition-less grading" - Students often feel that they are competing against one another for grades and that they must not only do well, but that they must do *better* than their classmates. To avoid, or at least limit, this counterproductive attitude, the course will be graded in such a way that it is possible for *every* student to get an A. All students who receive 85% or more (468) of the possible 550 total points on the quizzes, hour exams and final will be guaranteed an A. A total of 385 (70%) guarantees you a B; 330 (60%) gets you a C, and 275 (a mere 50%) means that you pass the course, though with a D.
- b) "You've seen it before" – Students sometimes feel that exam questions are different in emphasis or level of difficulty from the problems they deal with in class or in the homework assignments. To eliminate the temptation that instructors sometimes experience to put just one more clever little twist into a problem, I will take all problems (this does not include multiple choice or extra credit items) on exams and quizzes directly from the book, though I may change details like names of elements or numerical values. Since I provide the solutions to all problems from the book on WebCT, if you look at the solutions to all the problems in each chapter, you will have seen the exam problems *and their solutions* before you have to do them. Of course, there are a lot of problems in each chapter, so you are more likely to succeed if you try to *understand* the solutions to typical problems rather than trying to memorize the solutions to all of them.

- c) “The curve” - Past experience suggests that considerably less than 100% of the class will earn an A by the standards outlined above. Some exams may be harder than others. In order to take into account variations between exams, at the end of the semester, I will rescale the grades for each component (quiz total, each hour exam, final, and extras) so that its average is 65% of the possible total for that component (e.g., if the class average is 60 on hour exam 1 and 160 on the final, I will multiply grades on hour exam 1 by $65/60$ and on the final by $130/160$) before adding them up to compute the final grade. I will then use these rescaled totals to assign a final letter grade. If the results of this process and process a) above differ, you will get the higher of the two letter grades. For each of the exams (but not the quizzes), I will post on WebCT a graph showing the results and a rough indication of the numerical scores corresponding to A’s, B’s, C’s and D’s (i.e., “the curve”). **These numbers are provided only to give you an idea of where you stand and should not be taken as rigorous indicators of your final grade, i.e., don’t expect the average of these rough letter grades to agree exactly with your final grade.**
- d) “Redemption points” – Students occasionally have a bad day on an hour exam or figure out a topic only after the exam has been given. In order to give students a second chance to show that they have mastered material, I have, at the cost of some additional mathematical manipulation when calculating grades, come up with the following system. The final exam will be divided into four parts. The first three will correspond to the sets of topics covered on the first three hour exams. If you score less than 100% on an hour exam, you have the chance to “redeem” up to half of the points you missed by doing well on the corresponding section of the final. The way this system works is that if your percent score on a section of the final is better than your percent score on that hour exam, I will replace your hour exam score by the average of your hour exam score and your score on that section of the final. There is no penalty if you do worse on the final than on the hour exam. For example, if on hour exams 1 and 2, you get 60% and 90%, and on parts 1 and 2 of the final you get 98% and 88%, your score on hour exam 1 will be increased from 60 to $(60+98)/2 = 79$. Your score on hour exam 2 will remain unchanged, since you did worse on the final. You will thus have earned 19 redemption points.

Getting to know you:

In a class this size, it is not easy for the instructor to get to know each student individually. I shall try to learn every student’s name, but I shall almost certainly fall short of 100% success. I am more likely to get to know you if you make an effort to interact with me, e.g., by asking questions during or after class, coming to office hours, sitting in the front row, getting the highest (or lowest) grade on the first exam, ... In addition, I am happy to eat lunch in Usdan, Sherman or the Stein with students in the class. We can talk about chemistry, Brandeis, the Red Sox, or anything else that’s on your mind. Anyone interested in such a lunch, either individually or with a group, should see or email me.

Students with disabilities:

If you are a student with a documented disability, please see the instructor immediately so that all appropriate accommodations can be made. No accommodations can be made retroactively.

Latte:

WebCT is an electronic resource that provides a variety of on-line enhancements to courses. I plan to use it to provide solutions to problem sets and exams, information about any changes in schedule and supplemental materials.

To access Latte, go to latte.brandeis.edu and enter your id and password (the same ones you use to log into your Brandeis e-mail account - your UNet id and password). You should find CHEM 11A in a list of courses in which you are enrolled.

Please note: If you have something to communicate to the instructor that you do not want to share with others in the course, you should send it to his email (address given above) and not through Latte. Also, if you need a quick response from me, you are more likely to get it via email than via Latte, since I read my email more regularly than I check Latte. Note, however, that I check my email only rarely after 6 PM and on weekends, so don't expect an instant reply if you send me an urgent question at 2 in the morning.

Recitations:

Recitations will be run by Dr. Novack Monday-Thursday, 4-5 PM in Kosow 116. You are welcome to attend as many of these sessions a week as you would like, but we encourage you to attend at least one. During recitations we will use the assigned homework problems to review concepts you are learning during lectures. After we work through any problems you are finding difficult, you will have the opportunity to complete a recitation exercise with problems of the same type that you have never seen before to test your skill at solving them and your understanding of the material as we prepare you for exams and quizzes.

In order to maximize the effectiveness of the recitations, **please email Dr. Novack by noon of the recitation day with any problems and/or questions you would like to have covered**, and bring your textbooks with you!

Supplemental Instruction

Supplemental Instruction (SI) sessions will be scheduled based on your responses to the survey that you have been given to complete. It is our goal to make these sessions as convenient for you to attend as possible. SI is a wonderful opportunity for you to process the course material in small groups that maximize your active participation. Sessions will be led by students who have completed this course successfully and know what it takes to get the grades that you want! By engaging actively in these short (one-hour) collaborative learning sessions, you will be able to process as much material as it would take you two and a half hours to study on your own! You will find more information about SI in the brochure that you were given on the first day of class.

Academic honesty:

Academic integrity is central to the mission of educational excellence at Brandeis University. University policy on academic honesty may be found in your Student Handbook under Rights and Responsibilities. While students are encouraged to discuss subject matter inside and outside of the classroom (see "Study groups" in particular), all work submitted, especially quizzes and exams, must be your own individual effort. Cheating is unfair to your fellow students, to the instructor, and to yourself. Violations of University policies on academic integrity, described in Section Three of Rights and Responsibilities, may result in failure in the course or on the assignment, or in suspension or dismissal from the University.

***Preliminary Class schedule and assignments for CHEM 11a,
Fall, 2007***

All Problem assignments are from Hill, Petrucci, McCreary and Perry,
General Chemistry, 4th ed. (referred to as HPMP)

Lecture 1, Thurs., Aug. 30

Introduction and diagnostic test

Read HPMP, Chapter 1

No class Mon., Sept. 3 (Labor Day)

Lecture 2, Wed., Sept. 5

Chemistry: Matter and Measurement

Problems – HPMP, Ch. 1: #8, 22, 33, 41, 57, 71, 83, 95 (Also, read “A word of advice”
on p. 28)

NOTE: Date given for a problem set is date by which you should have at least attempted
the problems. They don't have to be handed in.

Lecture 3, Thurs., Sept. 6

Atoms, Molecules and Ions

Quiz #1 (on Chapter 1)

Read HPMP, Chapter 2

Lecture 4, Mon., Sept. 10

Atoms, Molecules and Ions

Problems – HPMP, Ch. 2: #4, 22, 25, 29, 42, 82, 85, 112

Lecture 5, Wed., Sept. 12

Atoms, Molecules and Ions

No class Thurs., Sept. 13 (Rosh Hashanah)

Lecture 6, Mon., Sept. 17

Stoichiometry: Chemical Calculations

Read HPMP, Chapter 3

Quiz #2 (on Chapter 2)

Lecture 7, Wed, Sept. 19

Stoichiometry: Chemical Calculations

Problems – HPMP, Ch. 3: #4, 10, 19, 27, 33, 49, 53, 63, 77, 108

Lecture 8, Thurs., Sept 20

Stoichiometry: Chemical Calculations

Lecture 9, Mon., Sept. 24
Chemical Reactions in Aqueous Solution
Read HPMP, Chapter 4
Quiz #3 (on Chapter 3)

Lecture 10, Wed., Sept. 26 (BRANDEIS THURSDAY)
Chemical Reactions in Aqueous Solution
Problems - HPMP, Ch. 4: #17, 32, 40, 54, 59, 67, 74, 91, 112

EXAM #1, WED. EVENING, SEPT. 26, 6:30-8 PM
Covers Chapters 1-3

[NOTE: Observant students may arrange to take the exam earlier to avoid conflict with Sukkot]

No class Thurs., Sept. 27 (Sukkot)

Lecture 11, Mon., Oct. 1
Chemical Reactions in Aqueous Solution

Lecture 12, Wed., Oct. 3
Gases
Read HPMP, Chapter 5
Quiz #4 (on Chapter 4)

NO CLASS THURS., OCT. 4 (SHEMINI ATZERET)

Lecture 13, Mon., Oct. 8
Gases
Problems – HPMP, Ch. 5: #13, 20, 34, 44, 61, 79, 86, 89, 110

Lecture 14, Tues., Oct. 9 (BRANDEIS THURSDAY)
Gases

Lecture 15, Wed., Oct. 10
Gases
Last day to drop without transcript notation of “W”

Lecture 16, Thurs., Oct. 11
Thermochemistry
Read HPMP, Chapter 6 (Section 6.8 is optional)
Quiz #5 (on Chapter 5)

Lecture 17, Mon. Oct. 15
Thermochemistry
Problems – HPMP, Ch. 6: #13, 19, 26, 29, 40, 51, 64, 69, 74, 95

Lecture 18, Wed., Oct. 17

Thermochemistry

Lecture 19, Thurs., Oct. 18

States of Matter and Intermolecular Forces

Read HPMP, Chapter 11 (Sections 11.8-11.10 are optional)

Quiz #6 (on Chapter 6)

Lecture 20, Mon., Oct. 22

States of Matter and Intermolecular Forces

Problems – HPMP, Ch. 11: #8, 20, 29, 34, 38, 44, 62, 83

Lecture 21, Wed., Oct. 24

States of Matter and Intermolecular Forces

EXAM #2, WED. EVENING, OCT. 24, 6:30-8 PM

Covers Chapters 4-6

Lecture 22, Thurs., Oct. 25

States of Matter and Intermolecular Forces

Lecture 23, Mon., Oct. 29

Physical Properties of Solutions

Read HPMP, Chapter 12 (Section 12.10 is optional)

Quiz # 7 (on Chapter 11)

Lecture 24, Wed., Oct. 31

Physical Properties of Solutions

Problems – HPMP, Ch. 12: #2, 3, 27, 37, 40, 47, 54, 64, 76, 88, 98

Lecture 25, Thurs., Nov.1

Physical Properties of Solutions

Lecture 26, Mon., Nov. 5

Physical Properties of Solutions

Lecture 27, Wed., Nov. 7

Atomic Structure

Read HPMP, Chapter 7

Lecture 28, WED. EVENING, Nov. 7, 6:30PM

(Makeup lecture for Wednesday before Thanksgiving)

Atomic Structure

Problems – HPMP, Ch. 7: #6, 18, 25, 35, 41, 56, 66, 73, 98

Quiz #8 (on Chapter 12)

Lecture 29, Thurs., Nov. 8

Atomic Structure

Lecture 30, Mon., Nov. 12

Electron Configurations, Atomic Structure and the Periodic Table

Read HPMP, Chapter 8 (Sections 8.8 and 8.9 are optional)

Quiz #9 (on Chapter 7)

Lecture 31, Wed., Nov. 14

Electron Configurations, Atomic Structure and the Periodic Table

Problems – HPMP, Ch. 8: #14, 24, 30, 43, 45, 50, 57, 81, 87

EXAM #3, WED. EVENING, NOV. 14, 6:30-8:00 PM

Covers Chapters 7, 11 and 12

Last day to drop with a “W” transcript notation

Lecture 32, Thurs., Nov. 15

Electron Configurations, Atomic Structure and the Periodic Table

Lecture 33, Mon., Nov. 19

Chemical Bonds

Read HPMP, Chapter 9 (Sections 9.11 and 9.12 are optional)

Quiz #10 (On Chapter 8)

NO CLASS WED.-THURS., NOV. 21-22 (THANKSGIVING)

Lecture 34, Mon., Nov. 26

Chemical Bonds

Problems – HPMP, Ch. 9: #9, 11, 13, 16, 20, 30, 35, 38, 46, 52, 56, 68

Lecture 35, Wed., Nov. 28

Chemical Bonds

Lecture 36, Thurs., Nov. 29

Bonding Theory and Molecular Structure

Read HPMP, Chapter 10 (Sections 10.8 and 10.9 are optional)

Quiz #11 (on Chapter 9)

Lecture 37, Mon., Dec. 3

Bonding Theory and Molecular Structure

Problems – HPMP, Ch. 10: #3, 4, 16, 17, 28, 32, 37, 52, 57, 65, 81

Lecture 38, Wed., Dec. 5

Bonding Theory and Molecular Structure

Lecture 39, Thurs., Dec. 6

Bonding Theory and Molecular Structure + cool demos

Quiz #12 (on Chapter 10)

Monday-Tuesday, Dec. 10-11 Study Days – Review Session (time and place to be determined)

Final Examination – TBA