

CHEMISTRY 109

Lecture 2, Fall 2005

Read This Syllabus Today. Keep It for Future Reference.

Advanced General Chemistry:	5 credit hours
Whole Class Sessions:	2:25 pm MWF 1351 Chemistry
Instructor Information:	Professor Judith N. Burstyn 5327 Chemistry (262-0328) http://www.chem.wisc.edu/~burstyn chem109-3@chem.wisc.edu
Problem-Solving Workshop:	M 6:45 – 7:45 pm, 1371 Chemistry
Office Hours:	T 4:30 – 5:30 pm, 5327 Chemistry or email for an appointment

Chemistry 109 is a one-semester accelerated first-year college course in chemistry. The goals of this course are: 1) to build your skills in problem solving, analytical reasoning, and laboratory manipulation, and 2) to build your knowledge of the fundamental chemical principles of atomic and molecular structure, kinetics, and thermodynamics. In this class we will apply these principles to condensation-hydrolysis reactions, acid-base reactions, and oxidation-reduction reactions. We will emphasize applications in living organisms, for example in drug design, and in the industrial world, for example in fuel production and utilization.

“How do I know if Chemistry 109 is the right course for me?” If you answer yes to all of the following three questions, Chemistry 109 is the right course for you. 1) Does your potential major require chemistry beyond General Chemistry, or are you undecided but considering majors that would require more chemistry? 2) Did you qualify for placement into Calculus (Math 221)? 3) Did you take at least one year of high school chemistry with a grade of A- or better, or if you received a B, do you especially enjoy chemistry and are you willing to work hard to master it?

Course Organization and Expectations

This course is designed to help you to learn chemistry. Your professor and TA will do their best to guide you in mastering the material, but no course or instructor can learn for you. Learning is something only you can do. For that reason you are the most important feature of the course. Many learning activities are offered in order to meet the needs of different types of students; however, if you find that your learning needs are not being met or you are not satisfied with some aspect of the course please bring your concern to your professor, your TA, or your Student Board of Directors representative.

You will need to devote considerable out-of-class time to studying chemistry. A good rule of thumb is that you should be spending approximately three hours outside of class for each hour you are in class. A recommended study strategy for this course is: 1) read the assigned material in the text before each whole class session, 2) attend class and take your own notes, 3) as soon as possible after class, begin to work homework problems. When you encounter problems that you cannot solve, refer to the text, your notes, a tutorial, or your fellow students. Forming a study group to work through problems is an excellent way to learn chemistry.

Throughout this course emphasis will be placed on understanding chemistry and learning to think effectively in solving problems. Successful problem solving requires a basic knowledge of principles, facts and terms: a vocabulary of chemistry. Some of this background and vocabulary should have been obtained from your high school chemistry course. From time to time you may need to review material you studied in high school in order to understand the new material presented in this course. To help you review there are three Review Homework assignments. The first of these must be completed next week and the second the week after next. The third comes at the end of October. Chemistry is a cumulative subject; what you learn this semester will build upon background material that you learned earlier.

To help you to master the new material presented in this course, specific learning objectives are provided for each exam. These objectives are available under the Content and Exam Preparation Materials headings in Learn@UW (see below). Use

the learning objectives to guide your work on the homework sets and to review for the exams. Study questions keyed to the learning objectives are also available in the same location to give you more problem-solving practice. Practice exams, and fully worked out answers, will be available for you to use in preparing for each exam.

Required Texts & Materials

You will need to purchase each item listed below. These are the only required items for this course.

Textbook: *Chemistry: The Molecular Science, 2nd edition*, by Moore, Stanitski, and Jurs: the special abridged edition or the full text, available from local bookstores.

Lab Manual: *Chemistry 109 Laboratory Manual, Fall 2005*, Chemistry Department, University of Wisconsin-Madison: available from Alpha Chi Sigma (the chemistry fraternity/sorority) in the chemistry building.

Lab Notebook: Carbonless laboratory notebook with duplicate pages: available from Alpha Chi Sigma or local bookstores (where it is more expensive).

Safety Goggles: Industrial quality eye protection is required at all times when you are in the lab. Safety goggles that completely seal around the eyes and fit over regular glasses can be purchased from local bookstores.

Calculator: An inexpensive calculator is required. It should have capabilities for square roots, logarithms and exponentiation (antilogarithms), and exponential (scientific) notation operations. The calculator will be used on homework assignments, pre-lab quizzes, exams, and in the lab. You may use programmable calculators in this course.

Web-Based Course Materials and Class Emails

To access Web-based materials, you must activate your UW-Madison NetID so you have an ID and password. You probably did this at SOAR last summer. If not, activate your NetID by going to <http://my.wisc.edu>, clicking on Activate your NetID, and following the directions. You may also change your NetID password at this same Web site.

Much information about this course will be transmitted via email, using an automated email list based on registration in the course. An email was sent to everyone on this list before the first class meeting. If you did not receive such an email, you probably are not reading your @wisc.edu emails. It is best to use your @wisc.edu email for UW-Madison communications. If you like, you can tell your other email accounts to forward to your @wisc.edu email account.

Technology Enhanced Learning: the Learn@UW Web Site

Much of the material for this course is only available via Learn@UW. You automatically have access to the 109 materials via Learn@UW if you are enrolled in this course. You can use Learn@UW on your own computer, a friend's computer, or any other computer on campus. Direct your Web browser to <https://uwmad.courses.wisconsin.edu/>, Check your browser settings!, and log in. You will be asked for your NetID Username and Password. If you have a problem logging in, and you have been registered for this section of Chem 109 for at least two days, send an email to rbain@chem.wisc.edu.

Please log in to Chemistry 109, Lecture 2 in Learn@UW as soon as possible. Go to Homework and Quizzes and work on the **Practice Quiz**, which is designed to check out your computer to make sure it will do everything you will need during the semester. Do the Practice Quiz on the computer you are most likely to use for online homework assignments and tutorials this semester. The Practice Quiz is due at midnight, Monday, September 12, but don't wait until the last minute to do it. If you have trouble getting your own computer to do the Practice Quiz, then use a computer in the chemistry building to complete the assignment. If you change computers during the semester, do the Practice Quiz on the new computer to be sure that all the functions work.

Begin to work on **Homework 1** and **Review Homework 1**; both homeworks are due at midnight Sunday, September 11.

Safety Quiz

Before your first lab period you must take a Safety Quiz in Learn@UW and achieve a perfect score. The Safety Quiz is available in Learn@UW under Homework & Quizzes. Once you see the list of assignments, scroll down below the numbered homeworks and choose Safety Quiz. If you carefully read the red safety pages (pp xvii to xx) in your lab manual before taking the Safety Quiz, you should have no difficulty in achieving a perfect score.

Health or Disability Concerns

All students at UW are entitled to an accessible, accommodating, and supportive teaching and learning environment. The provision of reasonable accommodation for students with disabilities is a shared faculty and student responsibility. Students are expected to inform their professor of their need for accommodation; the professor and TA are expected to make the necessary arrangements. If you have special needs, please make an appointment to speak to Prof. B. and your TA at your

earliest convenience. If you have a condition that might result in a seizure, loss of consciousness, or other situation that might endanger your safety or the safety of others in the laboratory, please inform your TA.

The rest of this syllabus and the course schedule are in Learn@UW. Log in and go to the Content menu. Under Course Info click on Syllabus, Assignment Schedule, or another heading to download a PDF file. The full syllabus contains information about how your final grade will be calculated, among other things.

Learning Activities in Chemistry 109

Chemistry 109 has different learning activities to meet the needs of the many types of students in our class. You do not need to attend every class, make use of every tutorial, or do every study problem; rather, your job is to sample the different types of materials offered and to select those activities that most effectively support your learning. In the whole class meetings, the professor will lecture, do demonstrations, or lead problem solving. In discussion section, your TA will engage a smaller group of students in problem solving, answer specific questions on the course material, and introduce the laboratory exercises. Finally, in lab you will explore chemical principles through hands on experimentation. To supplement these activities, tutorials are provided to aid your mastery of the material. Attendance at the whole class meetings and the discussion sections is not required; however, students who consistently attend outperform those who do not. Laboratory attendance is mandatory: students who do not attend will not pass this course.

Whole Class Sessions

In class Prof. B. will provide an organizational framework, discuss principles, and present illustrations and demonstrations. She will not describe or explain everything you should learn; rather, she will indicate what topics you should study and should provide insights into those topics. Lectures will also give you an opportunity to think about these topics and see whether you understand them. You should take notes during lecture; notetaking should be an active, thinking process. Your notes should reflect your understanding of what you heard and saw. Prof. B. will provide opportunities for you to test your understanding of particular concepts through in class questions. If there are particular concepts or ideas that are not clear to you feel free to ask Prof. B. or your TA about them after class, by email, or in office hours. Sample lecture notes taken by a Teaching Assistant (TA) will be posted in Learn@UW shortly after each lecture; don't rely on these notes in place of your own but if you need to miss a class, they are an acceptable substitute. Please do not expect to learn everything you need to know in the classroom; you will learn far better by working problems on your own or with a group of other students outside of class.

How to Use Your Textbook Read the assigned sections of the textbook prior to each whole class session. Take the time to carefully review the illustrations, equations and graphs in your textbook; your text does an outstanding job of using these to illuminate important chemical concepts. Visualization is an important tool that chemists use to understand the world, especially when thinking about molecular structure. Try to make your reading an active process; keep track of those concepts that are confusing, so you will be able to pay especially close attention as those concepts are covered in class. As soon as possible after class, try to work the sample exercises without looking at the answers (which are at the end of the book in an appendix). When you understand the sample exercises, practice your problem solving skills by working the related homework questions or the selected study questions for that material. Review the learning/exam objectives that relate to a given topic as you study. At the end of each chapter you will also find a summary of important facts, concepts and operational skills that you should have mastered as you studied that chapter.

General Chemistry Now Web Site and CD-ROM You have access to a Web site designed to accompany your textbook, provided that you have purchased a new copy of the book. Wherever you see the "Chemistry Now" icon in the printed book, there is online material available at <http://chemistry.brookscole.com/moore2e> that may help you to learn key concepts. Your textbook contains the CD-ROM and a Passcode that together provide a gateway to the General Chemistry Now Web site maintained by Thomson-Brooks/Cole, the publisher of your textbook. This Web site is organized around the chapters in the textbook. For each chapter you can take a pretest that will evaluate your background and then highlight in the "What do I need to learn" menu those items you should study especially carefully. There is also a posttest that will help you decide how well you have learned. There are many coached problems and interactive figures (simulations and animations) in the "What do I need to learn" menu. General Chemistry Now is not graded and does not contribute directly to your score, but it does include much useful material to help you learn. If you are using a slow Internet connection, downloading files from the Web site will be tedious and you should put the CD that comes with the book into your CD-ROM drive.



Laboratory

Laboratory work is important to an understanding and appreciation of chemistry, and for those of us who love chemistry, lab work is really fun. The laboratory exercises are designed to illustrate the principles described in class, and the exams will include questions based upon the laboratory material. **Note that you must successfully complete all laboratory assignments and achieve an overall lab score of at least D in order to receive a passing grade in Chem 109.**

During the lab period you will carry out the experiment, take notes, and complete your data analysis. *All your work must be turned in within 24 hours of the end of your lab period, in the format specified in the lab manual or by your TA.* You will be evaluated on your pre-lab preparation, your in-lab experimental technique and data analysis, and on your ability to observe chemical phenomena and record your observations in your notebook. Each laboratory experiment will have its own criteria for grading and your TA will apply those criteria to evaluating your work.

Pre-lab Quizzes. Pre-laboratory Quizzes are available via Learn@UW. You can take each Pre-lab Quiz twice and your higher score will count. Pre-lab Quizzes must be completed before you go to your scheduled laboratory class; that is, if you have lab at 7:45 am on Tuesday, you must take the Pre-lab Quiz for that week before 7:45 am on Tuesday.

ChemPages Laboratory Resource ChemPages is an interactive, Web-based encyclopedia of laboratory techniques. You will be able to access ChemPages from any computer on the campus network either from the General Chemistry web page, <http://genchem.chem.wisc.edu/>, or from the ChemPages menu in Learn@UW. ChemPages contains multimedia demonstrations of the laboratory techniques that you will use in this course. For almost every laboratory one or two ChemPages sections will be assigned—see your lab manual to find out which they are. You should view these pages before taking the Pre-lab Quiz.

Discussion Section

Discussion sections are lead by your Teaching Assistant for a group of 22 students. The discussion periods are for questions, help, review, and problem solving relevant to recent whole class sessions, homework, laboratory experiments, computer exercises, and other assigned material. Discussion sections will be most helpful if you are prepared when you come to the class. You should have at least tried to work out the homework problems or the objective-keyed study questions from the text. Feel free to bring a printed copy of your homework with you, marked with areas where you need help; your TA cannot solve the specific problems that you have been assigned, but he or she will have a similar example for the class to solve together. Bring specific questions to ask; be sure you understand the questions asked by others and the answers given by your TA and fellow students. Your active participation in discussion will help you and your fellow students learn.

Problem Solving Workshops Every Monday evening (except the Week of September 5 and the week of each exam) there will be a problem-solving workshop, generally lead by Prof. B. You will participate as a member of a group of students who will collaborate to try to solve a challenging problem based on the *previous week's work*. These challenge problems are very similar to the mastery level problems that you will encounter on the exams. The purpose of these workshops is to give you practice in applying the principles you are learning in solving real-world problems.

Exams

There will be three evening exams of approximately 75 minutes each and a 2-hour final exam. Each midterm exam will cover the classroom, special assignment, and laboratory material up to that point in the course and since the previous exam. The final exam will be divided approximately equally between the material since the third exam and comprehensive coverage of the entire semester.

An early exam will be given before each midterm at 3:30 PM for students who have conflicts with the assigned time. Please note the exam dates on your calendar and avoid scheduling anything at those times. If you have an unavoidable conflict, contact your professor well in advance. (We are aware of a recurring conflict with certain sections of EPD 160: if you have this conflict, please notify your TA and professor.)

Midterm Exams:	Monday, Sept. 26	5:40 – 7:00 PM
	Monday, Oct. 24	5:40 – 7:00 PM
	Monday, Nov. 21	5:40 – 7:00 PM
Final Exam:	Saturday, Dec. 17	10:05 AM – 12:05 PM

The room in which you will take each exam will be announced later. A review session will be held before each exam. ***No make-up exams will be given, but appropriate accommodation will be made for all students to be fairly evaluated. If you have any type of special need, options are available to take the exam at an alternate time or place; please contact Prof. B. as soon as possible to make the arrangements.***

Learning Objectives, Study Questions and Practice Exams Learning objectives for each exam, and a selected set of study questions from the textbook keyed to the learning objectives, can be found in the Exam Preparation Materials menu in the Content section of Learn@UW. Exams given in Chemistry 109 in a prior year are available in the same location. The study questions are located at the end of each chapter in the textbook, and the answers for many of these questions are given in the back of the book. These problems are typical of those you should master and you should use them for extra practice in problem solving. In some cases your online homework will suggest that you work on specific study questions to make sure you understand a concept. If you do not understand how to solve one or more study questions, ask your TA in discussion section or during office hours.

How To Prepare For Exams A recommended strategy is: 1) review the learning objectives for the exam referring to your notes or the text if necessary, 2) work the study questions associated with each objective, spending more time working problems on those topics you find most challenging, 3) simulate the test taking situation by working the practice exam in 75 minutes in a quiet place, 4) “grade” your own test using the answer key as your guide, 5) review those areas that you identify as weak, and then work the other half of the practice test.

Online Homework

Each week you will have an online homework assignment in **Learn@UW**. These assignments are available only in **Learn@UW** under the Homework and Quizzes menu. They include questions that test whether you understand the major concepts in each chapter and whether you can apply your understanding to solving problems. Three review homework assignments are designed to help you review material from your high school chemistry course. You can do each Online Homework twice and your higher score will count. It is to your advantage to do the first Online Homework early, because it will provide you with study guidance. Because only your higher score counts, you can use the guidance to direct your study during the week and then score well on the second try near the deadline. Online Homework is due every Sunday at midnight and can be done from any computer on the campus network. Your lowest homework score will be dropped.

There are several useful things to know about online homework. 1) You will not get the same questions as other students do, although most of the questions on your homework will be on the same topics as those for other students. The second time you do the homework, you almost certainly will get different, but similar questions from the first time, so you should read each question carefully and make certain you answer what is asked for. 2) You can start a homework, print a copy of the questions, exit from Learn@UW, answer the questions on paper, and go back at a later time to enter your answers into Learn@UW. As long as you do not submit a homework for grading, it will still be there for you to work on with exactly the same questions. 3) You are strongly encouraged to start your first try as early as possible and to ask other students or your TA to help you to learn how to solve the types of problems found on the homework. Don't wait until the last minute before the deadline and then do both homeworks, as this will result in your learning less and getting less benefit from the homework assignment.

In order for you to view the online homework and pre-lab quizzes, your computer must be configured appropriately. We have provided a **Practice Quiz** that tests all the features you will need. You should do the practice quiz on the computer you expect to use for online homework and pre-lab quizzes to make certain that it works OK and you will be able to view everything you need to see. If you have trouble viewing something, the Practice Quiz will tell you how to fix the problem.

Computer Assignments

Each of the four computer assignments has its own set of directions that will be mentioned in lecture and posted on the course Learn@UW site. It is your responsibility to obtain the directions from the course Web site, follow them, and turn each Computer Assignment in on time. The Computer Assignments are to be turned in to your TA at the time indicated on the assignment and in the Course Schedule. The fourth Computer Assignment is a set of four Biomolecules Tutorials, each worth 5 points, which you will need to work through. Three Biomolecules Tutorials are due the same week and the fourth is due two weeks later; this is indicated in the course schedule. Each Biomolecules Tutorial has an accompanying quiz that you must complete successfully to receive credit for the tutorial. The score on the quiz is your score for the tutorial.

Important Administrative Information For Chemistry 109

Student Board of Directors

The Student Board of Directors helps Prof. B. to run the course and provides feedback from students on how the course is going. The Board consists of one representative from each discussion/lab section, chosen by the students in that section. The board will meet nearly every week at 5:30 PM on Thursdays to discuss course policies, structure, and content. Meetings will take from half an hour to an hour depending on how much we have to discuss. Your TA will solicit volunteers for this role in your first discussion. If you are interested in serving as your class representative, send me an email (see below) as soon as possible. Include your name, your email address, your section number, and your TA's name in your message.

Electronic Mail

All students at UW-Madison have access to free electronic mail through the university. This is a very useful resource and one that I hope you are already using. You are encouraged to contact Prof. B. by email if you have questions about anything to do with the course. Electronic mail is available at all times of day and night, so you can send messages whenever something comes to mind. Do not, however, expect immediate responses in the middle of the night! My email address is for this class is chem109-3@chem.wisc.edu. You will quickly discover that I have another email address. Because I get hundreds of messages every day to that account, I find it easier to communicate with students via a special account; however, in case of a genuine emergency (illness for an exam, for example) please contact me either by phone or at

Burstyn@chem.wisc.edu. NOTE: Routine class messages sent to the burstyn email account will likely be buried! I guarantee answers to emails within 24 hours if you send them to the class account.

What To Do If You Are Sick, Or Otherwise Unable To Attend An Exam or Lab

If you are unable to attend a specific lab session because of an unavoidable schedule conflict, for example a religious observance, an athletic activity, or a family obligation, contact your TA as soon as possible to reschedule. Make up lab times can be accommodated only during the week when the entire class is doing a lab exercise, so planning ahead is important. If you find that you are unable to attend lab because you are ill, contact your TA as soon as possible. He or she will discuss your situation and decide what to do. **If circumstances arise unexpectedly that preclude your taking an exam, please contact your TA or professor before the scheduled exam time.** We recognize that in an emergency situation, you may not be able to contact us in a timely way.

Chemistry Resource Facilities: Computer Room, Study Room, General Chemistry Office

Computers are available for use in room 1375 Chemistry. Room 1371 is a study room for chemistry students. The staff in the General Chemistry Office, room 1328, can assist you with enrollment, advising, and many other things.

Cell Phone Policy

If you bring a cell phone to class or lab, please turn it off for the duration of the class or lab period. If there is a situation that requires that you be able to answer your cell phone during a class, please inform your instructor before the class.

Grades

Your grade will be based on a maximum of 950 points divided as follows:

Best 15 of 16 Learn@UW Online Homeworks @ 8 points each <i>(see Course Assignment Schedule for due dates; includes both weekly and review homework assignments)</i>	120 points
Twelve Laboratories will make up 25% of the course grade* <i>(each week's experiment is listed in the schedule; point total includes Pre-Lab Quizzes in Learn@UW)</i>	240 points
Four Computer Assignments Excel Exercise (10 points) Window on the Solid State (10 points) Alkimers (9 points) Biomolecules Tutorials and Quizzes: (four @ 5 points each (20 points) <i>(due dates are listed in the schedule)</i>	49 points
Safety Quiz <i>(must be completed with a perfect score before first lab)</i>	6 points
Practice Quiz, Post-Course Survey @ 5 points each <i>(see course schedule for due dates)</i>	10 points
TA Personal Evaluation	25 points
Three midterm exams @ 100 points each <i>(dates and times are listed in the course schedule)</i>	300 points
Final Exam <i>(dates and times are listed in the course schedule)</i>	200 points
<hr/> Total	<hr/> 950 points

*Each lab exercise will be graded on a 10-point scale. At the end of the semester we will scale the total number of lab points to obtain your final lab point total. If necessary, some grades may be normalized upward to a common scale at the end of the semester to minimize differences in grading practices among discussion/lab sections.

Letter Grades.

Final grades will be based upon the absolute scale shown below. If you score the number of points indicated, then you will receive the letter grade indicated, regardless of how many other students achieve the same grade. There is no curve. Therefore it is to your benefit (and to your friends' benefit) that you help other students learn and they help you learn. After

each midterm exam you will be able to determine your probable grade by totaling your earned points, dividing by the total points possible at that time, multiplying by 950, and comparing with this list.

- A 860 points or more
- AB 830 to 859 points
- B 770 to 829 points
- BC 740 to 769 points
- C 600 to 739 points
- D 520 to 599 points

If necessary, adjustments will be made at the end of the semester, but these adjustments will never lower your final letter grade, only raise it. Past experience in Chem 109 is that the class average is about 3.2 on a four-point scale—above a B average.