Chemistry 103

Summer 2011

Lecture: Monday–Wednesday–Friday, 8:55–10:10 am, Chemistry 1361

Lecturer: Dr. J. Matthew Hutchison
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(Please include your TA's name and section number in any email)

Office Hours: Monday, Wednesday 11:30 am–12:30 pm

INTRODUCTION

Chemistry 103 is the first course in a two-semester sequence—designed with the expectation that students will continue with Chemistry 104. Chemistry 103 and 104 provide a general background concerning the principles and basis of chemistry and serve as a prerequisite for advanced courses, including Organic Chemistry (341 or 343), Analytical Chemistry (327 or 329), and Inorganic Chemistry (311).

Many topics in General Chemistry require a certain level of mathematical rigor. We require that freshman students place at least at the level of Math 113 before taking Chemistry 103. Most Chemistry 103 students have had high school chemistry. Some of the material in Chemistry 103 is similar to what is traditionally taught in a high school chemistry course, although at a more advanced level. If you have not had a chemistry course in high school, or if you experience any difficulty, you should speak with the instructor or your teaching assistant (TA) early in the semester.

This is an eight-week summer course that covers material normally taught in 15 weeks. Keep in mind that this means the workload will be more intensive, with longer lectures and discussions.

REQUIRED MATERIALS

Textbook: *Chemistry & Chemical Reactivity*, 7th edition by Kotz, Treichel, and Townsend.

Lab Manual: *Chemistry 103 Laboratory Manual*, Summer 2011, Department of Chemistry, UW–Madison; sold in the Undergraduate Chemistry Office. You will need $10 in cash.

Lab Notebook: 100-page carbonless lab notebook, available at local bookstores and in the chemistry building where lab manuals are sold.

Safety Goggles: Safety Goggles are required at all times when you are in the laboratory. Goggles can be purchased at local bookstores. You will learn more about acceptable goggles during the first lab period.

Calculator: You will need an inexpensive scientific calculator, capable of determining square roots, logarithms, exponentials, and scientific notation. Programmable calculators that are allowed on the SAT and ACT exams may be used on exams, provided that you do *not* store or use any programmable memory or application features.

LECTURE AND DISCUSSION

Lecture: Lectures organize the material, outline goals, and cover the basic principles of each topic. The lecture is not intended to describe or explain everything you will learn in the course; rather, it will indicate important topics to study and will give you an opportunity to think about these topics and see if you understand them. You should read the relevant material in the textbook *before* coming to lecture and take your own notes during lecture. A set of lecture notes taken by a TA will be available on the course website (accessed through Learn@UW). These notes are meant to supplement—not replace—your own notes. Attendance to lectures is required.

Lecture Demonstrations: When a demonstration is done in class, observe what happens and make certain that you understand the principles the demonstration is designed to illustrate. If you do not, ask questions either in lecture or in your discussion section. All demonstrations are important, and questions about demonstrations may appear on quizzes or exams. Questions will focus on understanding the demonstration as opposed to memorizing the result. For example, "Explain why the solution turned blue," might be asked instead of "What color was observed?"

Discussion Sections: You will meet with about 22 of your classmates and your TA after each lecture for discussion. During these meetings you will discuss and solve problems related to the assigned reading and homework, learn about upcoming laboratory assignments, and have an opportunity to ask questions. *You will benefit most from discussion if you have prepared ahead of time.* You should have already read the relevant material and worked some problems. Bring specific questions to discussion, as it is an excellent opportunity to learn from your TA and fellow classmates. Attendance at discussion is required.

Quizzes: Quizzes will be administered during the first 10 minutes of most of your discussion periods. Quizzes will be short, and cover material discussed during the previous lecture and discussion section. Missed quizzes may not be made up, except under extenuating circumstances. Your lowest quiz score will be dropped at the end of the semester when grades are determined.

Homework: Throughout the summer, several problems from your book will be assigned. These problems will include several skill-building exercises, which will not be graded, and a few problems that are more difficult and integrate several concepts that we will be learning. These more difficult problems will be collected in your discussion section and graded for completeness. You are encouraged to work on homework with your classmates, however, you must turn in your own work.

Classroom Etiquette: Cell phones should be silenced. Laptop computers may be used for note taking, however they are not encouraged. Using the computer or other devices during class for activities not related to the class (such as texting, web surfing, crossword puzzles, etc.) is both rude and very distracting—to you *and your classmates sitting nearby*. Finally, our lecture hall desks are very noisy when raised or lowered. Please wait until the lecture is over before you lower your desk at the end of class. Lecture will be dismissed promptly as much as possible, but occasionally just another minute or two is necessary to finish up. Please be considerate of your classmates.

LABORATORY

The laboratory is a vital part of this course. In the lab, you will develop skills that are not easily learned or demonstrated in lecture and discussion. These skills include:

- Using laboratory equipment properly
- Interpreting data
- Graphical analysis
- Designing experiments
- Working with others
- Scientific writing

NOTE: YOU MUST RECEIVE A PASSING GRADE IN THE LABORATORY COMPONENT TO RECEIVE A PASSING GRADE FOR THE ENTIRE COURSE.

Lab Assignments: There are a total of nine lab assignments: six "wet labs" conducted in the laboratory, and three computer based assignments done outside the lab. Instructions for labs and a description of the grading rubric are described in the lab manual. The lab schedule is included at the end of this document.

Before the lab period: In your laboratory manual, each experiment has a section titled "Preparing Yourself for this Experiment" to help you prepare for the laboratory. Read the relevant sections of the textbook and view the suggested web pages. Make sure you understand the chemical principles behind the experiment before coming to laboratory. You must prepare your lab notebook, as described in the manual, before being allowed to perform the experiment.

Prelab Quizzes: For most of the laboratory experiments there is a prelab quiz, administered by Learn@UW. The quizzes are not counted towards your score, but are recommended to gauge your preparedness. Your grade for each lab will include a score for your overall preparation (including preparing the lab notebook) and your performance, which is often indicative of how well prepared you are.

Safety in the Laboratory: The "Safety" section of the lab manual covers general precautions for all experiments. Failing to follow proper laboratory safety may lead to you being dismissed from the laboratory and receiving zero credit for the experiment. Many experiments also have a section in the lab manual titled "For Your Safety" that describes specific safety precautions for each individual experiment.

Attendance: You must attend all laboratory sessions unless you have a valid excuse. Make-ups can only be scheduled in rare circumstances. A grade of zero will be recorded for unexcused absences. If you need to miss a lab, notify your TA as soon as possible, preferably *before* the lab period.

Reports: Lab reports are due at the end of the laboratory period, unless specified otherwise. Reports for on-line laboratories are due at the beginning of discussion section on the days specified in the Course Calendar at the end of this document.

RESOURCES

Numerous resources are available to assist you with either this course in particular or college life in general. It is up to you to take advantage of these resources to ensure your success both in this course and at UW-Madison.

Your Instructors: Your TA and I are available to help you! We all have regularly scheduled office hours and can also be contacted via email. Don't hesitate to contact me if you have questions or concerns about the course or the work you are doing. I will respond to all email messages either directly, or, when appropriate, in the next lecture. I also welcome questions after lecture and am available by appointment. Please include your TA's name in all your emails.

Course Web site on Learn@UW (learnuw.wisc.edu)***:*** Our website can be accessed via Learn@UW. The syllabus, schedules, office hours, TA lecture notes, course handouts, Power Point slides, homework assignments, announcements, and grades will be available. You should check this site frequently for reminders and announcements about the course.

General Chemistry Website (genchem.chem.wisc.edu)***:*** Resource materials for general chemistry students are available on the General Chemistry website. The computer laboratory exercises, ChemPages, and other lab resources are accessed via the "Materials for Labs" link. Copies of old exams from other lectures are available in the "More for Students" section.

Study Groups: Collaboration with other students on homework assignments and laboratory discussion questions is recommended and encouraged. Study groups can be very helpful, as you can receive feedback on your own ideas and evaluate ideas from others. Note that you must also devote time to working as an individual. Evaluating work from others is a very different situation from generating ideas on your own. You must turn in your own write-up for assignments and write down the names of the people you worked with.

Tutoring Services: There are many tutoring services available on campus. See the General Chemistry website (genchem.chem.wisc.edu) in the "More for Students" section for specific information on these services.

Students with Disabilities: Appropriate accommodations for lecture, laboratory, discussion, and/or exams can be arranged for students with disabilities. The McBurney Disabilities Resource Center (www.mcburney.wisc.edu) can provide assistance. Students needing accommodations for this class should schedule a confidential meeting with Dr. Hutchison as soon as possible to discuss arrangements.

Advising and Counseling Services (University Health Services)***:*** College life can be stressful. If you are struggling with your academic course load or other academic issues, your advisor is a good resource. If you are struggling emotionally with anxiety, depression, or other health issues, individual counseling is available at University Counseling and Consultation Services. For information, go to their website (www.uhs.wisc.edu/home.jsp?cat_id=36) or call 265–5600. Crisis intervention services are also available 24 hours a day by dialing this phone number and pressing option 9.

EVALUATION

Your grade is based on a maximum of 561 points, divided as follows:

Three mid-term exams @ 60 pts. each	180	32%
Laboratory	170	30%
Final Exam	120	21%
Quizzes (best 14 of 15 @ 5 pts. each)	70	12%
Homework (7 problem sets @ 3 pts. each)	21	4%
	561	

Letter grades for the course will be assigned at the end of the semester, based on the percentage of earned points out of a total of 600.

A	90.0—100 %
AB	87.0—89.9 %
B	80.0—87.4 %
BC	75.0—79.9 %
C	65.0—74.9 %
D	55.0—64.9 %
F	< 55.0 %

This scale may be curved down at the end of the semester to adjust grades to the historical grade average in General Chemistry. The scale will never be curved up. You are competing against this scale, not against each other. If everyone in the class gets 90% and above, then everyone gets an A. The historical grade average is a B.

Exams: There will be three mid-term exams given during our regular lecture period. The final exam will be comprehensive. You may bring a 5x7 card to the exams.

Review your grades: Your grades will be available on the Learn@UW course website. Be sure to review your scores regularly and notify your TA promptly of any discrepancies. Do not wait until the end of the semester to request corrections.

Effort Required: The majority (but not all) of the students in Chemistry 103 are first-year university students. You will find several differences between this course and most of your high school chemistry courses. While the topics may be similar, we will be going into more depth, and I expect a higher level of understanding. Perhaps the biggest difference is the amount of time you will need to devote to this course. You should expect to spend anywhere from 15–20 hours per week *outside of class*. Some of you may need more or less depending on your academic background and native ability. In order to keep up, you may need to work on improving your studying and time management skills. Cramming and marathon study sessions are rarely effective. Try to spend some time on chemistry *every day*!

Academic Misconduct: It is expected that all students will conduct themselves with honesty, integrity, and professionalism. Any student caught cheating on an exam will receive an F in the course. Any student caught cheating on homework, a quiz, or lab (for example, copying another person's work or fabricating data) will receive a zero for that assignment. A second infraction will result in an F for the course. More information on what constitutes academic misconduct and policies on handling misconduct can be found in your lab manual and at the following website: www.wisc.edu/students/saja/misconduct/UWS14.html

STUDY TIPS

What's the best way to study chemistry? This is a very good question—one that I am often asked. The simple answer is "whichever way works for you", however I do have some recommendations that have worked for me:

1) *Read the chapters carefully*, in a quiet space away from distractions. Restrain yourself from multitasking—turn off your iPod, and stay away from distractions such as TV, email, texting, and web surfing.

2) *Take notes while reading*, and avoid underlining or highlighting passages. Highlighting does nothing but delay learning for later. Ask yourself "Why am I highlighting this?" The answer is probably, "so I can read this part again later". I find it better to write things down. There is something about the physical act of writing that makes a concept stick in the brain.

3) *In class, add to your reading notes*. Study these notes carefully and use the text to clarify and augment the class discussion. When studying for an exam, *recopy your notes*. Again, writing will stick in your brain better than reading. Good note taking is an essential skill to develop at university. The following website has good advice on note taking: www.dartmouth.edu/~acskills/success/notes.html.

4) *Work as many problems as possible*. Problem solving is a skill that you must practice. If you are having trouble with a problem, get a clean sheet of paper and write down everything you know about the problem and see if a solution comes to you. If you are stuck, take a break and tackle the problem later with a refreshed mind.

5) Don't just "plug and chug". You should know *why*, *when*, and *how* to use every equation and model we'll come across this semester. Expect questions on exams that test your *understanding*, not just your ability to regurgitate facts and do simple calculations.

COURSE CALENDAR

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	**6/13** Lecture 1 1.2, 1.5 2.1–2.4, 2.9	**6/14**	**6/15** Lecture 2 2.5–2.8, 2.10–2.11, 3.1–3.2 **Quiz 1**	**6/16** *Citizenship in the Lab*	**6/17** Lecture 3 3.3–3.6 **Quiz 2**
2	**6/20** Lecture 4 3.7–3.10 **Quiz 3**	**6/21** *Solutions, Density, and Graphing*	**6/22** Lecture 5 4.1–4.3 **Quiz 4**	**6/23**	**6/24** Lecture 6 4.4–4.5, 4.7 **Quiz 5**
3	**6/27** Lecture 7 5.1–5.5 **Quiz 6**	**6/28** *Reaction of Zinc and Iodide*	**6/29** Lecture 8 5.6–5.8 *Chem. Logic* due	**6/30**	**7/1** **Exam 1** *Chapters 1–4*
4	**7/4**	**7/5**	**7/6** Lecture 9 6.1–6.4 **Quiz 7**	**7/7** *Solution Calorimetry*	**7/8** Lecture 10 6.5–6.7 **Quiz 8**
5	**7/11** Lecture 11 7.1–7.4 **Quiz 9** *Lake Study* due	**7/12** *Synthesis of Alum*	**7/13** Lecture 12 7.5–7.6 **Quiz 10**	**7/14**	**7/15** **Exam 2** *Chapters 5–7*
6	**7/16** Lecture 13 8.1–8.5	**7/17** *Light, Color, and Solutions*	**7/18** Lecture 14 8.6–8.9 **Quiz 11**	**7/19**	**7/20** Lecture 15 9.1–9.2 **Quiz 12**
7	**7/25** Lecture 16 11.1–11.4 **Quiz 13**	**7/26** *Project Lab*	**7/27** Lecture 17 11.5–11.9 **Quiz 14**	**7/28**	**7/29** **Exam 3** *Chapters 8–9, 11*
8	**8/1** Lecture 18 12.1–12.4 *Project Lab* due	**8/2**	**8/3** Lecture 19 13.4–13.6 **Quiz 15** *Window on Solid State* due	**8/4**	**8/5** **Final Exam** *Comprehensive*