

# CHEMISTRY 103-1

## Spring 2012

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Lecture Section 1: M W F 2:25 – 3:15 Room 1351 Chemistry

Lecturer: Professor Gil Nathanson Room 7321 262-8098  
[nathanson@chem.wisc.edu](mailto:nathanson@chem.wisc.edu)  
office hours: 3:30-4:30 M, W

Problem Solving Sessions: To be determined

Web site: Our learn@UW web site and <http://genchem.chem.wisc.edu/>

General Chemistry Office: Room 1328 Chemistry 263-2424

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**Introduction.** Chemistry 103 is the first semester course in a two-semester General Chemistry sequence. The second semester course is Chemistry 104. Students who take Chemistry 103 should also plan to take Chemistry 104. Chemistry 103 and 104 provide a general background concerning the principles and factual basis of chemistry. The 103-104 sequence serves as a prerequisite for advanced courses such as Organic Chemistry (341 or 343), Analytical Chemistry (327 or 329), and Inorganic Chemistry (311). Students in Chemistry 103 should have placed into Math 114 or higher.

Chemistry 103 is a fun and enlightening course, but you will need to devote significant time and effort to mastering chemical principles and solving problems. To excel, you must study chemistry *every day!* Please be prepared to commit 8-12 hours outside of class each week toward this effort.

### TEXTBOOKS AND OTHER MATERIAL (Required)

1. *Chemistry: The Central Science*, Brown, LeMay, Bursten, Murphy and Woodward. **This is a custom edition for UW, available at the University Bookstore and at the Underground Textbook Exchange** Although few, if any, used copies are available, we have obtained a significantly discount price for this special edition! You may purchase either the hardcover edition or a slightly less expensive unbound edition.
2. *Chemistry 103 Laboratory Manual*, Spring 2012 and carbonless laboratory notebook. The manual and notebook can be purchased (cash only) outside the classroom during the first two week of classes and later in the General Chemistry Office (room 1328).
3. Safety goggles. Industrial quality eye protection is *required* in all chemistry laboratories. Safety goggles that fit over regular glasses can be purchased from local bookstores or along with the lab manual and notebook. Please note that sandals are not acceptable footwear in the laboratory. Contact lenses should **not** be worn in the laboratory because fumes or splashes may be caught between them and your eye.
4. An electronic RF "clicker". The lectures will make extensive use of student "voting" on concept tests, surveys, and other questions. You will need to buy an iClicker radio-frequency clicker and bring it to every lecture. This can be purchased at the University Bookstore.
5. An inexpensive calculator capable of calculating square roots, logarithms and exponential

operations. The calculator will be used on exams, homework assignments, and in the lab. A programmable calculator may be used as long no information is stored on it, such as chemical formulas or equations. It must be of the type allowable on an ACT or SAT exams (no cell phone or iPod calculators). You must clear the memory before entering the exam room.

6. A MasteringChemistry account for access to on-line homework. This is bundled with your new textbook for no additional charge. Instructions for registering are given on the course homepage on Learn@UW. If you purchased a used textbook or received one from another student, **you must** purchase your own access to the MasteringChemistry system online at: <http://www.masteringchemistry.com>.
7. Class handouts. Pick up handouts at the back of the room before lecture. You can also obtain a copy attached to the lecture notes on our Learn@UW web site.

## COURSE INFORMATION

**Lectures and Textbook.** During lectures I will introduce principles and illustrate concepts with examples and demonstrations. *Please* read the textbook **before** coming to class and take your own notes during lecture. In addition, a set of lecture notes taken in class by a T.A. will be available at our Learn@UW web site listed above about two days after the lecture. You will find a “chapter summary”, “key terms”, “key equations”, and “key skills” at the end of each chapter. These lists will help you focus on key points.

**Discussion Section.** Twice a week, you will meet with a Teaching Assistant and your classmates for discussion. In these meetings, you will discuss assigned homework problems, work with groups of students to learn new material or reinforce/review existing ideas, learn about upcoming laboratory assignments, and have a forum for answering questions. *Please* prepare for discussion by bringing specific questions to class – this is a great opportunity to learn from your TA and fellow classmates.

**Problem Sets.** Problem solving is a **crucial** aspect of this course and problems will be assigned on a regular basis. These will be completed online via the MasteringChemistry homework system. **A subset of the problems will be required, supplemented with additional recommended (but optional) practice problems.** You can log on multiple times to complete the assignment. See Learn@UW for more information on the MasteringChemistry online homework system.

The best way to learn chemistry is to do problems while and after you read the textbook and lecture notes. Your textbook is an excellent source of additional practice problems, and solutions to selected problems are given at the back of the book. Bring questions to your discussion section, to TA and faculty office hours, and to the problem solving sessions. *In order to excel in this course you **must** solve problems. Lots of them.*

**Quizzes.** Approximately 10 fifteen minute quizzes will be given during discussion sections to help you evaluate your progress. These quizzes count toward your final grade. Your TA will go over the quiz immediately afterwards, and **you** will grade your own quiz; however **full credit** will be awarded regardless of your score as long as you take the quiz and turn it in. Nonetheless, you should use your score as an indication of your progress in the course. Missed quizzes **cannot** be made up, but **two** quizzes will be dropped in calculating the final grade. If you miss a quiz for any reason, including illness, it counts as a dropped quiz.

**Problem Solving Sessions.** The TAs and professors will supervise out-of-class problem solving

sessions. This is *not* a lecture, but an opportunity to work through assigned problems with other students in groups. You are **strongly** encouraged to attend one of these sessions each week and work with your fellow students to hone your problem solving skills. Do not miss this opportunity!

**Lecture Demonstrations.** We will use demonstrations during lecture to illustrate important ideas and facts. Be sure to make careful observations of what happens. Questions about observations or principles that have been presented via demonstrations may appear on exams.

**Exams.** There will be three in-class exams of 50 minutes each and one two-hour final exam. *No* makeup exams will be given. Exams may include questions based on the laboratory material. The final exam will cover material from the entire semester. **Please be alert to these exam dates.** You must report any religious conflicts with exams or laboratory exercises to your teaching assistant within the first two weeks of classes.

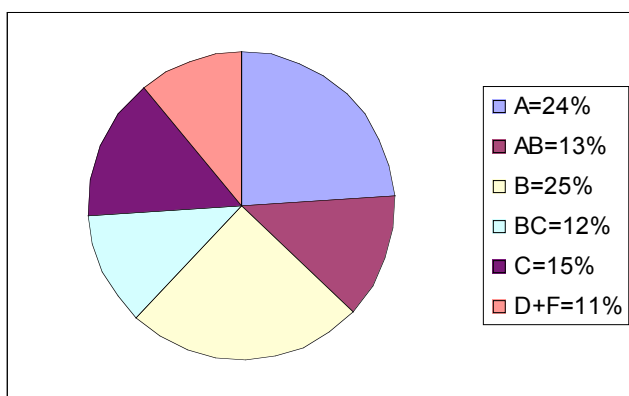
Exam Dates: Friday, February 17	2:25 – 3:15
Wednesday, March 14	2:25 – 3:15
Monday, April 23	2:25 – 3:15
Final Exam: <b>Monday, May 14</b>	<b>12:25 – 2:25</b>

**Grades.** Your final grade will be computed with the following scheme:

Three 50 minute exams	12% each
Online Homework	15%
Laboratory	20%
Quizzes	3%
Clicker participation	2%
Final Exam	24%
<hr/> TOTAL	<hr/> 100%

Your scores are always available to you at Learn@UW. There are no opportunities for extra credit.

The approximate distribution of final grades is given below. It is important to note that the distribution will be adjusted upwards if class performance exceeds my expectations. For example, we guarantee that at least 24% of the grades will be A, and it may be higher.



Approximate Distribution of Final Grades

Lecture attendance and active participation are **essential** to the learning process. You will be given many opportunities to participate by voting with your clickers. If you participate in **80% or more of the voting opportunities**, you will be awarded **full credit** for the “clicker participation” portion of your grade.

**Computers and Study Room:** Computers are available in the general chemistry computer room (room 1375). The study hall is located in room 1371.

### PLACES TO GO FOR HELP OUTSIDE CHEMISTRY 103

**1) University Counseling Center.** The UCC offers counseling to improve study skills and to reduce test anxiety. See <http://www.uhs.wisc.edu/services/counseling/> for a description, or call 265-5600 or stop by 333 East Campus Mall.

**2) Greater University Tutorial Service.** GUTS offers help in a variety of subjects (including Chemistry 103) and in improving study skills. It is a student-run, volunteer organization. See <http://guts.studentorg.wisc.edu/>

**3) Alpha Chi Sigma.** Chemistry Fraternity. Free tutoring on Wednesday night from 7 - 9 pm, 621 North Lake Street. See <http://www.chem.wisc.edu/deptfiles/genchem/students/tutorsF11.pdf>

**4) Private Tutors.** A list of private chemistry tutors (available for a fee) is available at <http://www.chem.wisc.edu/deptfiles/genchem/students/tutorsF11.pdf>

### THE LABORATORY

The laboratory experiments are a vital part of this course; you will develop skills that are not easily learned or demonstrated in lectures. These skills include:

- Designing experiments and interpreting data
- Using laboratory equipment properly
- Working with your fellow students in the laboratory
- Communicating your ideas about the data through discussions and writing

You must successfully complete the laboratory assignments to receive a passing grade in this course.

**Lab Preparation.** You **must** prepare in advance for each laboratory exercise by writing an introduction and procedural outline in your lab notebook. During the lab period you will carry out the experiment, take notes, and complete your data analysis. All your work **must** be turned in at the end of the period in the form of the duplicate pages from your lab notebook. You will be graded on your pre-lab preparation, in-lab experimental technique and data analysis, and on your note taking skills. Your laboratory report is due at a time specified by your TA, almost always at the end of the laboratory period. Please note that late laboratory reports are not graded.

The lab schedule is printed on the attached calendar. Exercises in italics are computer labs.

**Attendance.** You must attend all laboratory sessions. There is no opportunity to make up a laboratory that you miss; a grade of zero will be recorded for unexcused absences. If you have an excuse for missing lab, notify your TA as soon as possible, preferably before the lab period.

**Health or Disability Concerns.** If you have special needs, please make an appointment to speak to your professor and TA at your earliest convenience.

### Course Outline and Calendar

The course outline appears on the next page. Dates for lecture topics are **approximate**. The exam dates are **fixed**. The calendar on the page after the outline lists the lecture, exam, lab, quiz, homework, and problem solving dates. Please put the calendar in a place where you will see it each day!

Week	Date	Lect	Topic	Chapter	Lab
1	23-Jan	1	M Matter and Measurement	1	
		2	W Matter+Meas/Atoms,Molecules, Ions	1,2	Citizenship in Lab
		3	F Atoms,Molecules, Ions	2	
2	30-Jan	4	M Atoms, Molecules, Ions	2	<i>Solutions/Density</i>
		5	W Stoichiometry	3	
		6	F Stoichiometry	3	
3	6-Feb	7	M Stoichiometry	3	<i>No Lab</i>
		8	W Reactions in Aqueous Solutions	4	
		9	F Reactions in Aqueous Solutions	4	
4	13-Feb	10	M Reactions in Aqueous Solutions	4	No Lab
			W Exam Preparation		
			<b>F Exam I</b>		
5	20-Feb	11	M Reactions in Aqueous Solutions	4	Zinc and Iodine
		12	W Thermochemistry	5	
		13	F Thermochemistry	5	
6	27-Feb	14	M Thermochemistry	5	Synthesis of an Alum
		15	W Thermochemistry	5	
		16	F Thermochemistry	5	
7	5-March	17	M Electronic Structure of Atoms	6	<i>Lake Study</i>
		18	W Electronic Structure of Atoms	6	
		19	F Electronic Structure of Atoms	6	
8	12-March		M Exam Preparation		No Lab
			<b>W Exam II</b>		
		20	F Periodic Properties	7	
10	19-March	21	M Periodic Properties	7	Solution Calorimetry
		22	W Periodic Properties	7	
		23	F Chemical Bonding	8	
11	26-March	24	M Chemical Bonding	8	Light, Color, & Solns
			<b>W No Class</b>		
		25	F Chemical Bonding	8	
12	2-April		<b>Spring Recess</b>		
13	9-April	26	M Chemical Bonding	8	<i>Chemical Logic</i>
		27	W Chemical Bonding	8	
		28	F Molecular Geometry	9	
14	16-April	29	M Molecular Geometry	9	No Lab
		30	W Molecular Geometry	9	
			F Exam Preparation		
15	23-April		<b>M Exam III</b>		Project Lab
		31	W Solids	12	
		32	F Gases	10	
16	30-April	33	M Gases	10	<i>Win on Solid State</i>
		34	W Gases	10	
		35	F Intermolecular Forces	11	
17	7-May	36	M Intermolecular Forces	11	No Lab
		37	W Intermolecular Forces	11	
			F Exam Preparation		
18	14-May		<b>Monday Cumulative Final 12:25-2:25 PM</b>		

Note: labs in *italics* are computer labs

## CHEM 103-1/Nathanson Class CALENDAR

SPRING 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>Lab Dates</b>	Jan 23	24	25	26	27	28
Citizenship in Lab	First Lecture		Lecture		Lecture	No quiz
29	30	31	FEB 1	2	3	4
Solutions and Density	Lecture		Lecture		Lecture	Quiz 1
5	6	7	8	9	10	11
No Lab	Lecture		Lecture		Lecture	Quiz 2
12	13	14	15	16	17	18
No Lab	Lecture		Exam prep		<b>Exam I</b>	No quiz
19	20	21	22	23	24	25
Zinc and Iodine	Lecture		Lecture		Lecture	Quiz 3
26	27	28	29	MARCH 1	2	3
Alum Synthesis	Lecture		Lecture		Lecture	Quiz 4
4	5	6	7	8	9	10
<i>Lake Study</i>	Lecture		Lecture		Lecture	Quiz 5
11	12	13	14	15	16	17
No Lab	Exam prep		<b>Exam II</b>		Lecture	No quiz
18	19	20	21	22	23	24
Solution Calorimetry	Lecture		Lecture		Lecture	Quiz 6
25	26	27	28	29	30	31
Light, Color & Sol'ns	Lecture		<b>NO CLASS</b>		Lecture	Quiz 7
April 1	2	3	4	5	6	7
	<b>Spring Break</b>		<b>Spring Break</b>		<b>Spring Break</b>	
8	9	10	11	12	13	14
<i>Chemical Logic</i>	Lecture		Lecture		Lecture	Quiz 8
15	16	17	18	19	20	21
No Lab	Lecture		Lecture		Exam prep	Quiz 9
22	23	24	25	26	27	28
Project Lab	<b>Exam III</b>		Lecture		Lecture	No quiz
29	30	May 1	2	3	4	5
<i>Win on Solid State</i> Lab Checkout	Lecture		Lecture		Lecture	Quiz 10
6	7	8	9	10	11	12
No Lab	Lecture		Last Lecture		Exam prep	
13	14	15	16	17	18	19
	<b>12:25-2:25</b> <b>Final Exam</b>					