

# Chemistry 104-4

## Spring 2015

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<b>Office Hours (in study room 1371C):</b>	Mon 2:00-3:00PM; Wed 1:00-2:00PM
<b>Lectures:</b>	Tue/Thurs 2:30-3:45PM, Room 1351
<b>Labs:</b>	Room 1335
<b>Course Website on Learn@UW:</b>	<a href="https://learnuw.wisc.edu/">https://learnuw.wisc.edu/</a>
<b>General Chemistry Homepage:</b>	<a href="http://genchem.chem.wisc.edu/">http://genchem.chem.wisc.edu/</a>
<b>Undergraduate Chemistry Office:</b>	Room 1328 Chemistry 263-2424

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### INTRODUCTION

**Introduction.** Chemistry 104 is the second semester course in a two-semester General Chemistry sequence. 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). The prerequisite for Chemistry 104 is Chemistry 103. If it has been more than a semester since you took Chemistry 103, you may need to put in extra effort at the beginning of the semester to gain the necessary background.

### REQUIRED MATERIALS

1. *Chemistry: The Central Science* (12<sup>th</sup> Ed.), Brown, LeMay, Bursten, Murphy and Woodward. **This is a custom edition for UW, available at the University Bookstore.** Used copies are available, and we have obtained a significantly discount price for this special edition. You may purchase the hardcover edition, a slightly less expensive unbound edition, or an electronic-only text (available with a MasteringChemistry account—see item 6 in this list). You may already have a copy from 103.
2. *Chemistry 104 Laboratory Manual*, Spring 2015 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 from the first floor laboratory stockroom (room 1334).
3. Safety goggles. Industrial quality eye protection is **required** in all chemistry laboratories. Safety goggles that fit over regular glasses can be purchased from University bookstores or along with the lab manual and notebook.
4. An electronic RF “clicker”. The lectures will make regular use of student “voting” on concept tests, surveys, and other questions. You will need to buy a radio-frequency

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\* Please sign any email messages to Dr. Block with your name, TA's name & your discussion or lab section number. For example: Johan Smith, TA: Name, Sec. 431 (or 731).

clicker, specifically an i>clicker (or i>clicker2 or i>Clicker+) and bring it to every lecture. These can be purchased at the University Bookstore. **Register your clicker from the course Learn@UW page link even if you did so last semester (i>clicker now purges its database every semester).**

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 as 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>. If you took 103 within the last two years, your MasteringChemistry code should still allow you access this semester. The course ID is "CHEM104BLOCKS15".
7. USB Drive: A USB flash drive that will hold at least 2 GB is required for laboratory data collection.

## COURSE INFORMATION

**Course Organization and Expectations.** This course is designed to help you to learn chemistry. Your lecturer 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. 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 lecturer or your TA.

Many of you will have developed and optimized study styles from your Chemistry 103 course. A recommended study strategy for this course is: 1) read through textbook sections before each lecture, 2) attend class and take your own notes, 3) begin to work homework problems as soon as possible after reading the chapter. When you encounter problems that you cannot solve, refer to the text and its example problems, your notes, a tutorial, or your fellow students. Forming a study group to work through problems is an excellent way to learn chemistry. 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 primary themes.

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. This course includes a range of activities that are aimed at facilitating the learning process. These activities are described below.

**Lectures.** During lectures I will introduce principles and illustrate concepts with examples and demonstrations. In addition to your notes, a set of lecture notes taken in class by a TA will be available at our Learn@UW web site listed above about two days after the lecture. Each lecture will also contain "clicker" questions. Your participation in these questions will count toward your

final grade. In order to earn full points for clicker participation, you must answer at least 80% of in-class clicker questions.

Classroom etiquette does become important with courses this large. Cell phones should be turned off or at least silenced. While laptops are not prohibited in class, you will not have any need for them during lecture. Using the computer or other devices during class for activities not related to the class is very distracting, not only for you but for those who are sitting nearby. Finally, our lecture room desks are very noisy when raised or lowered; so please wait until the instructor is completely done speaking before you lower your desk at the end of class. As much as possible class will be dismissed at 3:45, but sometimes just another minute or two is needed to finish up. Please be considerate of your classmates.

**Discussion Section.** Twice a week, you will meet with a TA 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.** In addition, each problem set will have a few extra credit problems worth a couple points each. The maximum score for a homework set is still 100 points, but these extra credit problems can offset small errors and difficulties associated with the MasteringChemistry system user learning curve. The system gives hints and allows multiple attempts, each with feedback. A small deduction (detailed for each problem set in the assignment and problem descriptions) is taken for each successive attempt. You can log on multiple times to complete the assignment. See Learn@UW for more information on the MasteringChemistry online homework system. Assignments will typically be due by 11:55PM each Sunday night.

If you encounter technical difficulties with MasteringChemistry pertaining to how answers are submitted/accepted or why you did not get credit for an answer that was later revealed to be correct, please send an e-mail to [chem104hw@chem.wisc.edu](mailto:chem104hw@chem.wisc.edu) with your name, course number (104), lecture section (4), and a brief description of your difficulty. The group of people who assist you will not answer content related inquiries.

Your textbook is an excellent source of additional practice problems, and answers to selected problems are given at the back of the book. Bring questions to your discussion section and to TA and faculty office hours. *In order to excel in this course you **must** solve problems. Lots of them.*

**Quizzes.** Approximately 10-12 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.

**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.

## 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 all of 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 almost always due 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.

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. Further attire requirements are described in your laboratory manual and by your TA.

**Attendance.** You must attend all laboratory sessions. There is usually no opportunity to make up a laboratory that you miss. If you have an excused reason for missing lab, notify your TA as soon as possible, preferably before the lab period.

**Exams.** There will be three in-class exams of 75 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: Thursday, February 12	2:30 – 3:45PM
Tuesday, March 17	2:30 – 3:45PM
Tuesday, April 14	2:30 – 3:45PM
Final Exam: <b>Wednesday, May 13</b>	<b>7:45 – 9:45AM</b>

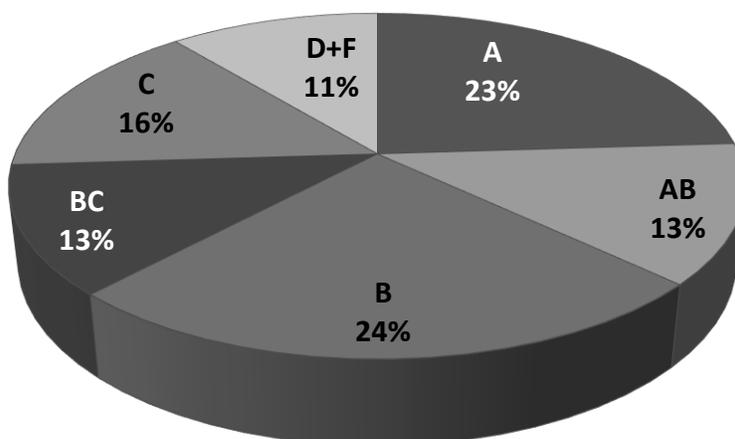
**Grades.** Your final grade will be computed with the following scheme:

Three 60-minute exams	12% each
Online Homework	15%
Laboratory	20%
Quizzes	4%
Clicker participation	3%
<u>Final Exam</u>	<u>22%</u>
TOTAL	100%

Your scores are always available to you at Learn@UW. There are no opportunities for extra credit beyond the couple points on assignments.

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 expectations. For example, we guarantee that at least 23% of the grades will be A, and it may be higher.

**Approximate Distribution of Final Grades**



## ADDITIONAL 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.

**Course Web-site on Learn@UW** (<https://learnuw.wisc.edu/>): Our course website can be accessed via Learn@UW. The syllabus, schedules, office hours, TA lecture notes, course handouts, announcements, lecture videos, and grades will all be available on Learn@UW.

**General Chemistry Web Site** (<http://www.chem.wisc.edu/content/genchem-main/>): 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 lecturers are available in the "More for Students" section.

**Study Groups:** You may collaborate with other students on homework assignments and laboratory discussion questions. Study groups reflect the teamwork inherent in the way modern science is done; scientists frequently collaborate with others, either within the same department or at a distance with persons in other cities, states or countries. It is important to realize that although you may collaborate with other students on assignments, the work you submit must be your own.

**Tutoring Services:** A number of tutoring resources are available on campus, some free and some for a fee. For more information, see our Learn@UW site or the General Chemistry home page (<http://www.chem.wisc.edu/content/genchem-main/>) under the "Information for Students" section.

**Students with Disabilities:** Appropriate accommodations for lecture, laboratory, discussion, and/or exams can be arranged for students with disabilities. The McBurney Disability Resource Center (<http://www.mcburney.wisc.edu/>) can provide assistance. Accommodations still must be made well in advance, so please pursue these avenues immediately.

**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 more information go their website (<http://www.uhs.wisc.edu/>) or call 265-5600. Crisis intervention services are also available 24 hours a day by dialing this same phone number and pressing option 9.

**Academic Misconduct:** It is expected that all students will conduct themselves with honesty, integrity, and professionalism. Any student caught cheating on an exam (including submitting an altered exam for regrade) will receive an F in the course. Any student caught cheating on homework, a quiz, or lab (for instance, 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 chemistry lab manual and at the following website:  
<http://www.wisc.edu/students/saja/misconduct/UWS14.html>

## Course Outline and Calendar

The course outline appears below. Dates for lecture topics are **approximate**. The exam dates are **fixed**. The course website on Learn@UW will have all specific reading suggestions and due dates as they become available.

Week	Date	Topic	Chapter	Lab
1	Tue 1/20	Brief Review and Intro to Organic Chemistry	9.2-9.6, 24	No Lab
	Thurs 1/22			
2	Tue 1/27	Organic Chemistry	24	Molecular Structures
	Thurs 1/29			
3	Tue 2/3	Organic Chemistry	24	Preparation of Aspirin and Some Flavoring Esters
	Thurs 2/5			
4	Tue 2/10	O. Chem and Review	24	No Lab
	Thurs 2/12	<b>Exam I</b>		
5	Tue 2/17	Reaction Kinetics	14	Biodiesel (and Redox Titration Prep)
	Thurs 2/19			
6	Tue 2/24	Reaction Kinetics	14	Redox Titrations
	Thurs 2/26			
7	Tue 3/3	Chemical Equilibria	15	Crystal Violet
	Thurs 3/5			
8	Tue 3/10	Chemical Equilibria	15	Chemical Equilibrium and Le Chatelier's Principle
	Thurs 3/12	Acids and Bases and review	16	
9	Tue 3/17	<b>Exam II</b>		No Lab
	Thurs 3/19	Acids and Bases	16	
10	Tue 3/24	Acids and Bases, Buffers	16	Copper Ammine Compounds
	Thurs 3/26	Additional Equilibrium Topics	17	
11	Tue 3/31	Spring Break		No Lab
	Thurs 4/2			
12	Tue 4/7	Additional Equilibrium Topics Review	17	Acid and Base Solutions
	Thurs 4/9			
13	Tue 4/14	<b>Exam III</b>		No Lab
	Thurs 4/16	Thermodynamics	19	
14	Tue 4/21	Thermodynamics	19	Chemical Equilibrium and Thermodynamics
	Thurs 4/23			
15	Tue 4/28	Electrochemistry	20	Electrochemical Cells
	Thurs 4/30			
16	Tue 5/5	Nuclear Chemistry	21	Neutron Activation of Silver (and check-out)
	Thurs 5/7	Nuc. Chem. and Review		
17	Wed 5/13	<b>Final Exam (7:45AM)</b>	All	