

# Chemistry 104

## Summer 2015

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<b>Lecturer:</b>	<b>Dr. Stephen Block</b>
<b>Office:</b>	Room 1321B Chemistry
<b>E-mail:</b>	<a href="mailto:sblock@chem.wisc.edu">sblock@chem.wisc.edu</a> *
<b>Phone Number:</b>	262-1511
<b>Office Hours (in study room 1371C):</b>	Tue, Thurs 2:00-3:00PM
<b>Lectures:</b>	M/W/F 8:55 - 10:10AM, Room 1351
<b>Labs:</b>	T/Th 8:50-11:50AM
<b>Group problem-solving sessions:</b>	Sterling Hall, Fri 10:20-11:35AM
<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. A university general chemistry textbook will be required for the course, though the specific text is left to the student to choose. *Chemistry: The Central Science* (12<sup>th</sup> Ed.), Brown, LeMay, Bursten, Murphy and Woodward and *Chemistry: The Molecular Science* (5<sup>th</sup> Ed.) have both been used by the department already, and should serve you well. You may already have a copy of one of these two from Chemistry 103 or its equivalent. If you have another textbook you would like to use, but would like for me to approve it, please feel free to ask.
2. *Chemistry 104 Laboratory Manual*, Spring 2015 (there is no separate print run for the summer term) and carbonless laboratory notebook. The manual can be purchased (cash only) from the first floor chemistry stockroom (room 1334). The notebook is available in the University bookstore.
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.

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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).

4. 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.
1. An ALEKS account for online homework. See e-mails from Dr. Block or supporting documentation on the course website for registration and use details.
2. 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/or "key skills" sections at the end of each chapter of most common textbooks. These lists can 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 a day after the lecture. Additionally, videos captured of lectures from the spring term will become available on Learn@UW over the course of the term. Each lecture will also contain questions asked of the class. Your participation in these questions will not count toward your final grade, but will guide some lecture explanations.

Classroom etiquette is rather important, even with courses that are not incredibly 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 10:10, 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 ALEKS system. You can log on multiple times to complete each assignment. See “Course Documents” on Learn@UW for more information on the ALEKS online homework system. Assignments will typically be due by 11:59PM each Sunday or Monday night. You should monitor your ALEKS account to keep track of the specific deadlines.

If you encounter technical difficulties with ALEKS, please send an e-mail their Customer Support through your ALEKS account (so that they have your information). Again, further instructions can be found in the “Introduction to ALEKS for UW Madison” document on Learn@UW. The group of people who assist you will not answer content related inquiries.

In some cases, ALEKS does not have a set of problems to address a topic covered in the course. For those topics, additional homework sets will be prepared and posted on the course website. While these additional problems are not graded, it is highly recommended that you treat them as you would treat any other homework assignment.

Textbooks are excellent sources of additional practice problems, and answers to selected problems are typically 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 7 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 one quiz will be dropped in calculating the final grade. If you miss a quiz for any reason, including illness, it counts as the 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.

**Group problem-solving sessions.** Every Friday morning from 10:20-11:35AM, we will meet in Sterling Hall (rooms 2301 and 2425) for a series of group problem-solving sessions. During these sessions, you will be presented with various complicated problems, and will be expected to work together to address the requests. Students who actively engage with the problems and with their groups will receive full participation credit for this portion of the course.

**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 or to me within the first week of class.

Exam Dates: Tuesday, June 30	10:00 – 11:15AM
Thursday, July 16	10:00 – 11:15AM
Tuesday, July 28	10:00 – 11:15AM
Final Exam: <b>Friday, August 7</b>	<b>9:00 – 11:00AM</b>

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

Three 75-minute exams	12% each
Online Homework	17%
Laboratory	20%
Quizzes	3%
Group problem solving participation	4%
<u>Final Exam</u>	<u>20%</u>
TOTAL	100%

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

The approximate grade cut-offs for final grades are given below. Be advised that most students tend to have a high score in lab, on homework, on problem solving participation, and on quizzes. The grade cut-offs shown below reflect the fact that exam averages tend to be lower. After each exam, I will offer estimated grade cut-offs so that you will be able to see how your exam scores are likely to play in to your final course grade, according to the performance of students who have taken this course in previous terms.

83 – 100%	A
80 – 82.99%	AB
76 – 79.99%	B
73 – 75.99%	BC
66 – 72.99%	C
58 – 65.99%	D
0 – 57.99%	F

## 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.

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

## 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.

Lecture	Day	Date	Topic	Textbook Chapter	Lab
1	M	15-Jun	Intro to Organic Chemistry	24	T: Citizenship in lab
2	W	17-Jun	Organic Chemistry	24	R: Molecular Structures
3	F	19-Jun	Organic Chemistry	24	
4	M	22-Jun	Organic Chemistry	24	T: Biodiesel
5	W	24-Jun	Organic Chemistry	24	R: <i>Tylenol/Flavoring Esters</i> (and redox prep)
6	F	26-Jun	Organic Chemistry	24	
7	M	28-Jun	Organic Chemistry	24	T: <b>Exam 1</b>
8	W	1-Jul	Kinetics	14	R: Redox Titration
9	F	3-Jul	Kinetics	14	
10	M	6-Jul	Kinetics	14	T: Neutron Ag
11	W	8-Jul	Kinetics	14	R: Crystal Violet
12	F	10-Jul	Chemical Equilibria	15	
13	M	13-Jul	Chemical Equilibria	15	T: <i>Chem. Equil. and Le Chatelier</i>
14	W	15-Jul	Acids and Bases	16	R: <b>Exam 2</b>
15	F	17-Jul	Acids and Bases	16	
16	M	20-Jul	Common ion effect, buffers	16/17	T: Acid/Base Solutions
17	W	22-Jul	Titrations	17	R: Copper Ammine
18	F	24-Jul	Additional Equil. Topics	17	
19	M	27-Jul	Thermodynamics	19	T: <b>Exam 3</b>
20	W	29-Jul	Thermodynamics	19	R: Chem. Equil. and Thermodynamics
21	F	31-Jul	Thermodynamics/Electrochem	19/20	
22	M	3-Aug	Electrochemistry	20	T: Electrochemical Cells
23	W	5-Aug	Electrochemistry/Wrap-up	20	R: Check-out/Review
24	F	7-Aug	<b>Final Exam</b>	Cumulative	