

# CHEMISTRY 104-1

FALL 2013

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General Chemistry 104:	5 credit hours
Lectures:	TR 9:30-10:45 a.m. in 1351 Chemistry
Lecturer:	Dr. Linda Zelewski
Office:	Room 7108 Chemistry (Take the elevator in the lobby at the corner of Johnson St. and Charter St. up to the 7 <sup>th</sup> floor.)
Email:	zelewski@wisc.edu (Please sign any email messages with your name, your TA's name and your discussion or lab section.)
Office hours:	See Learn@UW Homepage
Website:	<a href="https://learn@uw.wisc.edu">https://learn@uw.wisc.edu</a>
General Chemistry Homepage:	<a href="http://genchem.chem.wisc.edu">http://genchem.chem.wisc.edu</a>
Undergraduate Chemistry Office:	Room 1328 Chemistry, 263-2424

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Chemistry 104 is the second semester of a two-semester sequence. Chemistry 103 and 104 provide a general survey of chemical principles and facts, and are prerequisites 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

**Textbook:** *Chemistry: The Central Science with MasteringChemistry Technology Kit*, 12<sup>th</sup> edition by Brown, LeMay, Bursten, Murphy and Woodward, available at the University Bookstore. You may purchase the hardcover edition, a less expensive unbound edition, or an electronic-only textbook (available with a MasteringChemistry account).

**Mastering Chemistry Account:** Required to access on-line homework assignments. MasteringChemistry accounts are bundled with new textbooks. If you took Chemistry 103 in the last two years, your MasteringChemistry code should still allow you access this semester. If you purchased a used textbook or received a textbook from another student, you must purchase your own access code to the MasteringChemistry system online at <http://www.masteringchemistry.com>. Instructions on how to register and join the course are given on the course homepage on [Learn@UW](#). The course ID is "MCZELEWSKI42543".

**i>clicker:** Available at local bookstores. Bring your i>clicker to every lecture. Your i>clicker must be registered in every class in which you use it. **To register your i>clicker for Chemistry 104 Lecture 1, go to our homepage on Learn@UW and click on "Register your i>clicker".**

**Lab Manual:** *Chemistry 104 Laboratory Manual*, Fall 2013, Department of Chemistry, UW-Madison, available in the chemistry building lobby from Alpha Chi Sigma (\$20, cash only).

**Lab Notebook:** Carbonless laboratory notebook with duplicate pages, available from Alpha Chi Sigma and local bookstores. (You can continue to use your Chemistry 103 lab notebook until you run out of pages.)

**Safety Goggles:** Industrial quality eye protection is required at all times when you are in the lab. Safety goggles that fit over regular glasses can be purchased from local bookstores. Contact lenses should not be worn in laboratory because fumes or splashes may be trapped between them and your eyes.

**Calculator:** An inexpensive calculator having capabilities for square roots, logarithms and exponentiation (antilogarithms) and exponential (scientific) notation operations is required. The calculator will be used on homework assignments, exams and in the lab. A programmable calculator may be used on exams 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 exam (no cell phone or iPod calculators). You must clear the memory before entering the exam room.

**USB Drive:** A USB flash drive that will hold at least 2 GB is required for laboratory data collection.

## COURSE INFORMATION

This course has been designed and organized to help you 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 of you have developed and optimized study styles from your Chemistry 103 course. A recommended study strategy for this course is: 1) read through the textbook sections before each lecture, 2) attend class and take your own notes, 3) review your notes and fill in any missing information in your notes using the TA lecture notes posted on Learn@UW or your textbook, and 4) begin to work homework problems as soon as possible after reading each chapter section. When you encounter problems that you cannot solve, refer to the textbook and its example problems, your notes, a MasteringChemistry tutorial, or your fellow classmates. Forming a study group to work through problems is an excellent way to learn chemistry. Use the “chapter summary and key terms”, “key equations” and “key skills” at the end of each chapter to help you focus on key points.

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. Most of this background and vocabulary should have been obtained from Chemistry 103 or its equivalent. From time to time you may need to review material you studied earlier in Chemistry 103 in order to understand the new material in this course.

## LECTURE AND DISCUSSION

**Lecture:** During lectures, I will introduce principles and illustrate concepts with examples and demonstrations. A lecture is not intended to describe or explain everything you should learn; rather, it will indicate what topics it is important to study and provide some insight into those topics. Read the assigned sections of the textbook prior to lecture. Take notes during lecture to capture your understanding of what you heard and saw. Sample lecture notes taken by a TA will be posted on Learn@UW (under Materials, Content, Course Information) within two days after each lecture.

**Classroom Etiquette:** Cell phones should be turned off or 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 class (such as surfing the web, playing video games, texting, etc.) is both rude and distracting, not only for you, but for those who are sitting nearby. 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 when the bell rings, but sometimes another minute or two may be needed to finish up. Please be considerate of your classmates.

**Lecture Demonstrations:** The UW-Madison Chemistry Department has a longstanding tradition of using lecture demonstrations to help students understand chemistry. 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 exams.

**i>clickers:** The purpose of using clickers in lecture is to reinforce concepts and to encourage student engagement. By answering lecture questions using your clicker, you can earn up to 20 points toward your final grade. Bring your i>clicker with you to every lecture.

***In order to get credit for answering clicker questions, you must register your clicker for Chemistry 104-1 and you must attend the lecture in which you are enrolled.*** Register your clicker by clicking on the link on our Learn@UW homepage. If you do not register your clicker, I will not be able to link your clicker ID to you and therefore, you will not receive credit for your vote. If you attend the other lecture and use your clicker, you will not receive credit for your vote because your clicker can only be linked to the course in which you are enrolled.

In order to compensate for circumstances in which you may have to miss lecture due to an illness or another legitimate reason, or forget to bring your clicker to lecture, you will earn full credit (20 points) toward your final grade if you answer a minimum of 80% of the lecture questions using your clicker. If you answer less than 80% of the questions, you will earn (% questions answered  $\times$  1.25  $\times$  20) points. For example, if you answer 40% of the questions, you will earn  $0.40 \times 1.25 \times 20 = 10$  points. You do not need to get the question correct in order to earn credit for participating.

**Discussion Section:** Twice a week, you will meet with a TA and your classmates for discussion. During these meetings you will discuss assigned homework problems, work on group exercises, learn about upcoming laboratory assignments, and have an opportunity to ask questions. Bring specific questions to discussion as it is a great opportunity for you to learn from your TA and fellow classmates. Attendance and participation are highly correlated with comprehension and good grades. When you miss discussion, you miss a learning experience that cannot be duplicated by reading the textbook or lecture notes posted on Learn@UW. To encourage attendance and participation, at the end of the semester, your TA will assign up to 30 points based on attendance and quality of participation during the discussion period. Participation will be evaluated on whether you are prepared for discussion and complete the in-class group exercises and other activities organized by your TA.

**Exams:** There will be three mid-term exams given during the lecture period, and one final exam. ***NO MAKE-UP EXAMS WILL BE GIVEN.***

Exams will include questions on material covered in the lectures, discussion, laboratory, and the assigned reading. The final exam will cover topics from the entire semester. Most of the equations you will need and all constants (equilibrium constants, ideal gas constant, etc.) will be provided on a "Constants and Equations" sheet with each exam. The "Constants and Equations" sheet will be posted

on Learn@UW one week prior to the exam. Review this sheet prior to the exam and verify that you know what each variable in an equation represents and that you understand how to use each equation.

Exam 1	Tuesday, October 1	(9:30-10:45 a.m.)
Exam 2	Tuesday, October 29	(9:30-10:45 a.m.)
Exam 3	Tuesday, November 26	(9:30-10:45 a.m.)
Final Exam	Sunday, December 15	(5:05-7:05 p.m.)

### Homework:

Problem solving is a crucial aspect of this course and homework problems will be assigned on a regular basis. There will be an on-line MasteringChemistry homework assignment due most weeks during the semester. Homework problems can be accessed directly through [www.masteringchemistry.com](http://www.masteringchemistry.com), or you can link to this site from our Learn@UW homepage. ***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. The maximum score for each homework assignment is 10 points, but these extra credit problems can offset small errors and difficulties associated with using the MasteringChemistry software. You can log on multiple times to complete an assignment. For questions with multiple parts, you need to answer all parts of the question in order to get credit for that problem. It is your responsibility to make sure you have completed the entire question before the due date. If you forget to complete all parts of a question, you will receive zero credit for that problem. ***All homework assignments must be completed by 11:59 p.m. on the day of the week it is due.*** Most, but not all assignments will be due on Monday. Check the Weekly Assignments posted on [Learn@UW](#) for homework assignments and due dates.

Like all computer programs, MasteringChemistry requires the exact answer in the required format. If you have not used MasteringChemistry before, do the “Introduction to MasteringChemistry” assignment before attempting your first homework assignment. This assignment will familiarize you with the system and explain the different types of questions you will encounter and how to answer those questions. For example, in some homework problems will be asked to draw organic structures. “Introduction to MasteringChemistry” explains how the drawing software works.

There will be ten MasteringChemistry homework assignments, and your highest nine scores will count toward your grade. ***No extensions to the due date will be given, and you will not receive credit for late submissions.*** If you are unable to complete a homework assignment before the deadline for any reason, including illness or a family emergency, depending on how much of the problem set you were able to complete and the rest of your homework grades, this assignment may be your dropped score. Once the due date is past, you can still access homework problems; however, you will not receive points in the course for completing them.

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 actually correct, please send an email to [chem104hw@chem.wisc.edu](mailto:chem104hw@chem.wisc.edu) with your name, course number (104-1), and a brief description of the problem. The person receiving your email message receives email from students in other chemistry courses, so it is essential to include your course number (104-1) in your email message. The person receiving your email message will *not* be able to answer content-related questions. If you have content-related questions, please ask your TA.

## LABORATORY

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

- Designing experiments
- Learning proper laboratory techniques
- Using laboratory equipment properly
- Interpreting and analyzing data
- Communicating your ideas through discussions with others and writing

***YOU MUST ACHIEVE A MINIMUM SCORE OF 60% IN LAB IN ORDER TO RECEIVE A PASSING GRADE IN THE COURSE.***

**Safety Quiz:** Read the Safety section in your laboratory manual on pages xix-xxii and take the Safety Quiz on Learn@UW (under Assignments, Quizzes). ***The Safety Quiz must be completed no later than Sunday, September 8 at 10:00 p.m.*** There is no limit on how many quiz attempts you may make, and a perfect score of 5/5 is required to pass the quiz. If you do not pass the Safety Quiz before September 8, you will still have to take the quiz before you can be allowed to participate in any of the laboratory exercises; however, you will receive 0/5 points toward your final grade.

**Academic Honesty Quiz:** Read the Statement on Academic Integrity on pps. xxiii-xxiv in your lab manual before taking the Academic Honesty Quiz on [Learn@UW](#) (under Assignments, Quizzes). You can take the quiz up to two times and the higher of your attempt(s) will be recorded in Learn@UW. ***This assignment must be completed no later than September 8, 2013 at 10:00 p.m.*** In addition to completing the online assignment, you must complete the form following page xxiv in your lab manual, and give it to your TA before you will be allowed to perform any laboratory assignments.

**Laboratory Assignments:** There are ten laboratory assignments. Instructions for the labs and a description of the grading rubric are described in the lab manual. The use of cell phones in lab is strictly prohibited.

**Laboratory Preparation:** Before coming to lab you need to

- Read "Preparing for the Experiment" in the lab manual, and carry out the directions given. Note that online quizzes for most experiments are available on Learn@UW as a resource. ***These laboratory quizzes are not a graded component of this course.***
- Review relevant sections of your textbook.
- View the appropriate ChemPages on the web.
- Prepare your laboratory notebook. Before coming to lab, write a short summary statement and procedural outline of the experiment (see page xi in your lab manual for more information on what this entails), make tables to record experimental data, leave areas to record experimental observations, do any pre-lab calculations, and answer any prelab questions. An example of a prepared notebook is provided in the lab manual on pages xxxvii – xxxviii.

Your TA will check your notebook at the beginning of the lab session to make sure these requirements are met. ***If you arrive without a properly prepared notebook, you will be asked to leave the lab to correct this.*** Points will be deducted from your lab score for that assignment in accordance with the percentage of the procedure you were unable to participate in while preparing your lab notebook.

**Safety in the Laboratory:** The "Safety" section of the lab manual covers general safety precautions for all experiments. Each experiment also has a "For Your Safety" section with specific precautions that you

should read before coming to lab. Failure to follow proper safe laboratory practices, including not wearing safety goggles, may lead to you being ejected from the laboratory and receiving zero credit for the experiment.

**Attendance:** You are required to arrive to lab on time. Your TA will review safety information and any modifications to the experiment at the start of the lab period. *If you are late and miss part or all of the prelab discussion, you may not be allowed to enter the laboratory to perform the experiment.*

Unless you are formally excused, you must attend all laboratory sessions. There are no procedures to make-up laboratories you miss, and a grade of zero will be recorded for all unexcused absences. If you have an extenuating circumstance that will require you to miss lab, notify your TA as soon as possible before the lab period, and receive confirmation from your TA that your absence meets the requirements for being excused.

**Reports:** For most experiments, reports are due at the end of the laboratory period unless your TA specifies otherwise. Points may be deducted if reports are turned in late. *If you place a lab report in your TA's mailbox, it is your responsibility to send your TA an email notifying them. Lab reports turned in without email notification may not be accepted for credit.*

## LEARN@UW

Much of the material for this course is only available via our Chemistry 104 Learn@UW webpage (<https://learnuw.wisc.edu/>). The site contains assignments and due dates, schedules, office hours, TA lecture notes, PowerPoint slides, course handouts, announcements, and other materials. Check this site frequently throughout the semester.

## 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. This penalty includes incidents such as looking at another student's paper during an exam or altering an exam after it has been graded and then submitting it for re-grading. Any student caught cheating on a quiz or lab report (for instance, copying another person's work, bringing lab notebook pages from another student to the lab 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 UW policies on handling misconduct can be found at: <http://www.wisc.edu/students/saja/misconduct/UWS14.html> and [http://writing.wisc.edu/Handbook/QPA\\_plagiarism.html](http://writing.wisc.edu/Handbook/QPA_plagiarism.html).

*You are responsible for understanding what constitutes academic misconduct.* If you do not understand, you should consult the hyperlink above, or discuss this further with Dr. Zelewski. Note that if an assignment is completed as a group (for example, a group lab report or research paper), ***all group members are responsible for ensuring that the assignment meets the standards for academic conduct.*** All group members who contributed to an assignment that is found to violate the standards for academic honesty will be held equally responsible. If you are placing your name on an assignment, it is your responsibility to ensure that assignment was completed with integrity. If you believe that a member of your lab group is committing academic misconduct, you should notify your TA. Students who assist other students in committing academic misconduct are also in violation of UWS 14.

## ATTENDANCE POLICY

Your attendance at all scheduled classes is mandatory and essential for success in the course. However, circumstances occasionally occur where a student must miss a class. Students sometimes need to miss class for a religious observance, a UW athletic commitment, a field trip for another course, or some other legitimate reason. These are PLANNED absences and *any arrangements for making up missed work must be made well before the absence occurs*. Students who have a religious conflict with an exam must report the conflict to their TA within the first two weeks of classes. Students who have a UW athletic commitment, UW field trip for another course, or other legitimate school related reason for missing a class must report the conflict to their TA as soon as possible and a minimum of two weeks before the absence occurs. If you are seriously ill or have a family emergency and are unable to attend class, inform your TA as soon as possible via email. Lecture notes and PowerPoint slides for missed lectures are available on Learn@UW.

## GRADES

**Point Distribution:** If no changes are made, the total number of points you can earn is 870. The point distribution is detailed below. Minor adjustments may be made during the semester if needed. You will be advised of any changes.

Laboratory Safety Quiz	5 points
Academic Honesty Quiz	5 points
Biomolecule Quizzes: 4 quizzes @ 5 points each	20 points
Laboratory: 10 experiments @ 20 points each	200 points
On-line Homework: highest 9 of 10 at @ 10 points each	90 points
Discussion	30 points
Clicker Participation	20 points
3 Midterm Exams @ 100 points each	300 points
Final Exam	200 points

Your letter grade will be determined by calculating your final percentage using the formula:

$$\% \text{ score} = (\text{total points earned} / \text{total possible points}) \times 100\%$$

Lab grades will be normalized to a common scale before final grades are determined to minimize differences in grading practices between laboratory sections.

**Intended Grading Scale:** Letter grades will be assigned at the end of the semester based on the following intended grading scale:

A	90.0%
AB	88.0%
B	80.0%
BC	78.0%
C	70.0%
D	60.0%

This scale may be adjusted downward at the end of the semester, depending on the overall class average. It will never be adjusted upward. At the end of the semester, if the average class grade is less than 78%,

the grading scale will be lowered so the average course grade is at least a BC and the grade distribution is consistent with historical Chemistry 104 final grade distributions.

**Extra Credit:** You can earn 10 points of extra credit in this course by completing two online surveys. *You must complete both surveys in order to earn the 10 points.* Information on taking surveys will be posted on [Learn@UW](#) and announced in lecture. There are no opportunities for extra credit other than these surveys and the extra credit problems on MasteringChemistry.

**Review Your Grades:** All grades will be entered electronically in Learn@UW. Be sure to review your scores regularly and notify your TA promptly of any discrepancies. *Any discrepancies must be brought to your TA's attention before the final exam. After final grades have been released to the Registrar, no changes to grades will be made.*

## RESOURCES

Numerous resources are available to assist you with this course and 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/>): The site contains weekly assignments, due dates, schedules, office hours, TA lecture notes, course handouts, and other materials.

**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. ChemPages, and other lab resources are accessed via the "Materials for Laboratory" link.

**Study Groups:** Students are strongly urged to form groups of several students in order to study together outside of class and to collaborate on working homework assignments and laboratory discussion questions. A study group reflects the teamwork inherent in the way modern science is normally carried out at academic institutions – namely, scientists often collaborate with one another, either within the same university and/or with individuals or groups elsewhere. However, it is important to realize that although you may collaborate with other students on assignments, *the work you turn in must be your own.* Thus, you must turn in an individual write-up (not a copy of the study group's work) of your laboratory assignments. It has been found that students who interact with one another via Study Groups do significantly better in mastering the material in this course.

**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.

**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/services/counseling/>) or call 265-5600. Crisis intervention services are also available 24 hours a day by dialing this same phone number and pressing option 9.

**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. *Students needing accommodations for this class should schedule a confidential meeting with Dr. Zelewski during the first week of classes to discuss arrangements.*



## CHEMISTRY 104-1 OUTLINE AND CALENDAR

Dates for lecture topics are approximate. The exam dates are fixed. Specific reading assignments and a complete listing of all assignments and due dates are posted on our course website on [Learn@UW](#).

WEEK	DATE	LECTURE TOPIC	CH.	LAB
1	Sep 3 Sep 5	Organic and Biological Chemistry Organic and Biological Chemistry	9.2-9.6 24	<i>No Lab</i>
2	Sep 10 Sep 12	Organic and Biological Chemistry Organic and Biological Chemistry	24	Check In/ Molecular Structures
3	Sep 17 Sep 19	Organic and Biological Chemistry Organic and Biological Chemistry	24	Preparation of Aspirin and Some Flavoring Esters
4	Sep 24 Sep 26	Organic and Biological Chemistry Review	24	Biodiesel
5	Oct 1 Oct 3	<b>EXAM 1 (9:30-10:45 a.m.)</b> Kinetics	14	<i>No Lab</i>
6	Oct 8 Oct 10	Kinetics Kinetics	14	Neutron Activation of Silver
7	Oct 15 Oct 17	Kinetics/ Equilibrium Equilibrium	14 15	Crystal Violet
8	Oct 22 Oct 24	Equilibrium/ Thermodynamics Thermodynamics/ Review	15 19	Chemical Equilibrium & Le Châtelier's Principle
9	Oct 29 Oct 31	<b>EXAM 2 (9:30-10:45 a.m.)</b> Thermodynamics	19	<i>No Lab</i>
10	Nov 5 Nov 7	Acid-Base Equilibria Acid-Base Equilibria	16	Chemical Equilibrium & Thermodynamics
11	Nov 12 Nov 14	Acid-Base Equilibria Aqueous Equilibria	16 17	Acid & Base Solutions
12	Nov 19 Nov 21	Aqueous Equilibria Aqueous Equilibria/ Review	17	Copper Ammine
13	Nov 26 Nov 28	<b>EXAM 3 (9:30-10:45 a.m.)</b> <i>Thanksgiving Recess-No Classes</i>	17	<i>No Lab</i>
14	Dec 3 Dec 5	Electrochemistry Electrochemistry	20	Electrochemical Cells/ Check-out
15	Dec 10 Dec 12	Electrochemistry Electrochemistry/ Review	20	<i>No Lab</i>
<b>FINALS</b>	<b>Dec 15 (Sun)</b>	<b>FINAL EXAM (5:05-7:05 p.m.)</b>		