

# CHEMISTRY 104

FALL 2015

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Lecture 1:	TR 9:30-10:45 a.m. in Chem 1351
Lecture 2:	TR 1:00-2:15 p.m. in Chem 1361
Lecturer:	Dr. Linda Zelewski
Email:	zelewski@wisc.edu (Please sign all email messages with your name, your TA's name and your discussion or lab section.)
Office:	Chem 7108 (Take the elevator in the lobby at the corner of Johnson St. and Charter St. up to the 7 <sup>th</sup> floor.)
Office Hours:	See Learn@UW
Problem Solving Sessions:	Monday 4:30-6:30 p.m. in Chem 1371 See Learn@UW for a schedule of dates.
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:	Chem 1328, 263-2424
Chemistry Study Room:	Chem 1371
Chemistry Computer Room:	Chem 1375

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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 Molecular Science*, 5<sup>th</sup> edition, by Moore and Stanitski. The University Bookstore offers a custom package at a reduced price that includes the e-text and online homework system (OWLv2). You may purchase the hardcover edition, a less expensive unbound edition, or an electronic-only textbook (available with an OWLv2 account).

**OWLv2 Homework Account:** Required to access online homework assignments. If you took Chemistry 103 in spring or summer 2015, you do not need to purchase a new OWLv2 account. If you purchased a used textbook or received a textbook from another student, you must purchase your own access code to the OWLv2 system. Instructions on how to register and join the course are given on the Chemistry 104 Learn@UW homepage.

**clicker:** Available at local bookstores. Bring your clicker (i>Clicker, i>Clicker+ or i>Clicker2) to every lecture. (Our system does not support the i>Clicker Go app.) You must register your clicker for every class in which you use it. *To register your clicker for Chemistry 104, go to our homepage on Learn@UW and click on “Register your i>clicker”.*

**Lab Manual:** *Chemistry 104 Laboratory Manual*, Fall 2015, Department of Chemistry, UW-Madison, sold by Alpha Chi Sigma (\$20, cash only) in the chemistry building lobby during the first two weeks of classes.

**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 nonprogrammable calculator having capabilities for square roots, logarithms and exponentiation (antilogarithms) and exponential (scientific) notation operations is required. You may use any type of calculator when working on homework and laboratory assignments; however, programmable calculators will not be allowed when taking exams.

**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) do as many problems as possible. Pay special attention to the “Problem-Solving Examples” and do the “Problem-Solving Practice Problems” and “Conceptual Exercises” as you read the textbook. At the end of each chapter there are additional practice problems, and solutions to some of these problems are given at the back of the book.

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 Content, Course Information within two days after each lecture.

**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.

**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.

**Student Board:** As an instructor, I value your feedback. In order to establish a direct line of communication, I would like to assemble a Student Board that meets with me for approximately 30 to 45 minutes six times throughout the semester to discuss issues related to Chemistry 104. (See Learn@UW for meeting dates and locations.) The Board will consist of one representative from each discussion section.

- If you are in Lecture 1 and your schedule is open at 8:30 a.m. on Tuesdays and you are interested in representing your discussion section, please let your TA know as soon as possible.
- If you are in Lecture 2 and your schedule is open at 2:25 p.m. on Tuesdays and you are interested in representing your discussion section, please let your TA know as soon as possible.

**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 clicker with you to every lecture.

***In order to get credit for answering clicker questions, you must register your clicker by clicking on the link on our Learn@UW homepage.*** When you respond to a clicker question in lecture, your clicker sends its ID number and your letter response to a base at the front of the lecture hall. In order to give you credit for your vote, I need to know what clicker number belongs to you. Registering your clicker tells me what clicker ID number belongs to you. If you do not register your clicker, I will not be able to give you credit for your vote.

Each student in the course must have their own unique clicker ID, meaning it is not possible for you to share a clicker with another student in either lecture section. While you are you are strongly encouraged to attend the lecture in which you are enrolled, if you attend my other lecture, you will receive credit for your clicker vote.

On occasion you may have to miss lecture due to an illness or other legitimate reason. There may also be occasions in which you attend lecture, but you forget to bring your clicker or your clicker battery dies during the lecture. In order to compensate for these circumstances, 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.

**Problem-Solving Sessions:** Forming a study group to work through problems is an excellent way to learn chemistry. Get together with fellow Chemistry 104 students to work on homework and other assignments on Mondays from 4:30-6:30 p.m. in chem 1371. Several TAs and I will be at each problem-solving session to answer questions. (Note: Problem-solving sessions will not be held on Mondays immediately following a mid-term exam.)

**Discussion:** 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 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.

**Discussion Quizzes:** Your weekly discussion will incorporate periodic quizzes. These quizzes are important opportunities to evaluate your progress in the course. Your TA will go over the quiz immediately afterwards and you will grade your quiz; however, you will receive full credit as long as you complete the quiz and turn it in to your TA. Missed quizzes cannot be made up; however, we will drop one (missed) quiz when determining your final quiz grade.

**Exams:** There will be three mid-term exams and one final exam. Mark these dates on your calendar now. For the midterm exams, I requested exam rooms during regular lecture hours; however, if additional rooms are not available, the exam will be given in the evening from 5:45-7:00 p.m. I will not know until approximately one week before the exam date if the exam will be held during the lecture period or in the evening. *Please leave the following evenings open from 5:45-7:00 p.m. in the event that we have evening exams.*

Midterm Exams	Exam 1	Tuesday, September 29	Possibly in class or 5:45-7:00 p.m.
	Exam 2	Tuesday, October 27	Possibly in class or 5:45-7:00 p.m.
	Exam 3	Tuesday, November 24	Possibly in class or 5:45-7:00 p.m.
Final Exam	Lecture 1	Tuesday, December 22	2:45-4:45 p.m.
	Lecture 2	Thursday, December 17	10:05 a.m.-12:05 p.m.

*If you have a religious conflict with any of these exam dates, you must report the conflict to your TA within the first two weeks of classes.*

Exams will include questions on material covered in lecture, discussion, laboratory, and assigned readings. The final exam will cover topics from the entire semester. One week prior to each exam, a set of Exam Objectives will be posted on Learn@UW, which will outline the material you will be tested on.

**Online Homework:** Problem solving is a crucial aspect of this course and homework problems will be assigned on a regular basis. There will be an online homework assignment due most weeks during the semester. A subset of the problems will be required, supplemented with additional recommended (but optional) practice problems. You can log on multiple times to complete an assignment. Check the Weekly Assignments posted on Learn@UW for homework assignments and due dates.

There will be eleven homework assignments, and your highest ten 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 OWLv2 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 with your name, course number, 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 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.

**Safety Quiz:** Read the Safety section in your laboratory manual on pages xix-xxii and take the Safety Quiz on Learn@UW (click on Quizzes in the toolbar). ***The Safety Quiz must be completed and passed with a perfect score no later than Sunday, September 13 at 11:59 p.m.*** There is no limit on the number of times you can take the quiz. If you do not take and pass the Safety Quiz with a perfect score before September 13, 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 0/4 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 (click on Quizzes in the toolbar). You can take the quiz up to two times and the higher of your attempts will be recorded in Learn@UW. ***This assignment must be completed no later than Sunday, September 13 at 11:59 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 experiments.

## 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.***

**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 is strictly prohibited in lab.

**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 page xxxix.

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.*** In addition to losing performance points (20% of your lab grade), you will not receive credit for the part of the lab you were unable to complete because you were unprepared.

**Safety in the Laboratory:** The "Safety" section of the lab manual covers general safety precautions for all experiments. Each experiment also has a "Safety Information" 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.

**Laboratory Attendance:** You are required to attend the lab section in which you are enrolled and to arrive 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 your TA's lab briefing, you will lose performance points (up to 20% of your lab grade). ***If you arrive 30 minutes or more past the start time of your lab, you will not be allowed into lab 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 a religious conflict, UW athletic commitment, UW field trip for another course, or other legitimate school related reason for missing lab, ***you must report the conflict to your TA a minimum of two weeks before the absence occurs, receive confirmation from your TA that your absence meets the requirements for being excused, and make arrangements with your TA to make up the lab.*** If you are seriously ill or have a family emergency and are unable to attend lab, inform your TA as soon as possible via email and make arrangements with your TA to make up the missed lab.

**Evening Labs:** University Evening Exam Policy states that if a scheduling conflict exists between the evening exam of a day time course and a regularly scheduled evening course, the evening course takes precedence over the exam. If you have an evening exam that conflicts with your scheduled lab time, the instructor who is giving the evening exam must offer you an alternate time to take the exam.

## 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.

## GRADES

**Point Distribution:** If no changes are made, the total number of points you can earn is 670. The point distribution is detailed below. Minor adjustments may be made during the semester if needed. You will be advised of any changes.

Safety Quiz	4 points
Academic Honesty Quiz	4 points
Clicker Participation	20 points
Discussion Quizzes	20 points
Homework (highest 10 of 11 at @ 10 points each)	100 points
Laboratory	132 points
3 Midterm Exams @ 80 points each	240 points
Final Exam	150 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.

If UW-Madison closes due to bad weather on the day of the final exam and the final exam is canceled, your average midterm exam grade will be used as your final exam grade when calculating your final grade.

**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 80%, the grading scale will be lowered so the average course grade is at the B/BC cut-off and the grade distribution is consistent with historical Chemistry 104 final grade distributions.

**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.*

## 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 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.

## 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/>):** This 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/>):** This site contains resource materials for general chemistry students. ChemPages, and other lab resources are accessed via the "Materials for Laboratory" link.

**Office Hours:** Office hours are set times during the week when course instructors are available to answer your questions. Office hours for all instructors are open to all students in the course and are posted on Learn@UW.

**Problem-Solving Sessions:** Meet with your fellow students to work together on solving homework and other assignments on Mondays from 4:30-6:30 p.m. in Chem 1371. Several TAs and I will be at each problem-solving session to answer questions.

**Study Groups:** You are strongly encouraged to form small groups that get together outside of class to work on homework and laboratory assignments. 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. 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.

**Health or Disability Concerns:** All students are entitled to an accessible, accommodating and supportive teaching and learning environment. The McBurney Disability Resource Center (263-2741) provides resources for students with disabilities. You will need to provide documentation of your disability to the McBurney Center in order to receive official university services and accommodations. *If you need accommodations for this course, please contact me and your TA early in the semester to discuss arrangements.*

## CHEMISTRY 104 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	R Sep 3	Review of Bonding and Molecular Structure	6, 7	<i>No Lab</i>
2	T Sep 8 R Sep 10	Organic Chemistry Organic Chemistry	10 10	<i>No Lab</i>
3	T Sep 15 R Sep 17	Organic Chemistry Organic Chemistry	10 10	Check In & Molecular Structures
4	T Sep 22 R Sep 24	Organic Chemistry Organic Chemistry	10 10	Esters and Amides
5	T Sep 29 R Oct 1	<b>EXAM 1</b> Chemical Kinetics	11	<i>No Lab</i>
6	T Oct 6 R Oct 8	Chemical Kinetics Chemical Kinetics	11 11	Biodiesel
7	T Oct 13 R Oct 15	Chemical Equilibrium Chemical Equilibrium	12 12	Crystal Violet
8	T Oct 20 R Oct 22	Chemical Equilibrium Acids and Bases	12 14	Chemical Equilibrium and Le Châtelier's Principle
9*	T Oct 27 R Oct 29	<b>EXAM 2</b> Acids and Bases	14	<i>No Lab</i>
10	T Nov 3 R Nov 5	Acids and Bases Aqueous Equilibria	14 15	Copper Ammine Compounds
11	T Nov 10 R Nov 12	Aqueous Equilibria Aqueous Equilibria	15 15	Acid and Base Solutions
12	T Nov 17 R Nov 19	Thermodynamics Thermodynamics	16 16	Chemical Equilibrium and Thermodynamics
13	T Nov 24 R Nov 26	<b>EXAM 3</b> <i>Thanksgiving Recess</i>		<i>No Lab</i>
14	T Dec 1 R Dec 3	Electrochemistry Electrochemistry	17 17	Electrochemical Cells
15	T Dec 8 R Dec 10	Electrochemistry Nuclear Chemistry	17 18	Neutron Activation of Silver & Check-out
16	T Dec 15	Nuclear Chemistry	18	<i>No Lab</i>
<b>FINAL EXAMS</b>	Dec 17-23	<b>Lecture 2: Thursday, December 17, 10:05 a.m.-12:05 p.m.</b> <b>Lecture 1: Tuesday, December 22, 2:45-4:45 p.m.</b>		

\*The last day to drop classes is Friday, October 30.