



## Chemistry 103 goals and course outcomes

We want you to learn to think like a chemist. With that in mind, this course has been designed and organized to help you learn chemistry. We will do our best to guide you, but no course or instructor can learn for you.

Successful students are proactive about their learning and establish patterns of study.

We have two overarching goals for our chemistry program: 1) You will conceptualize the invisible by understanding the atomistic model of matter and the role of energy in transformations, and 2) you will operate as a scientist by learning how to think logically, communicate effectively, and solve problems methodically.

By the end of Chemistry 103, you will:

1. Gain understanding in a breadth of basic chemical concepts and principles.
  2. Develop the ability to solve a wide variety of integrative chemistry problems.
  3. Apply submicroscopic models of matter to explain observable phenomena.
  4. Visualize and apply chemical and mathematical models.
  5. Design, conduct and analyze experiments safely and successfully.
  6. Develop the study skills and habits of independent learners.
  7. Articulate chemical knowledge and understanding in a written context.
- 

## Chemistry 103 learning environment

As partners in learning, we all have responsibilities for every class period. We have prepared an interactive and engaging set of activities for which your pre-session preparation is critical. Each component is important for your success. Do not overlook any of them.

We know that success in this course depends upon your ability to solve problems. Developing your problem solving skill is a key aim of this course. We will give you a lot of opportunities to practice problem solving. The most successful students devote most of their study time to problem solving. We advise you to practice problem solving every day. In emphasizing problem solving skills, we aim to cultivate your ability to connect these problems to broader chemistry concepts.

We promise that by the end of Chemistry 103, you will be a more mature learner, a stronger thinker, and have a much better grasp of how to think like a chemist. To be successful in Chemistry 103, you must learn to be an independent learner and problem solver.

**The components of Chemistry 103 are:**

---

<p><b>Activities on course site Learn@UW, OWL</b></p> <p>Purpose: To serve as the organizational hub for all activities in the course and prepare for in-person sessions during the week.</p>	<p><b>To support your success, Chem 103 instructors will:</b></p> <ul style="list-style-type: none"> <li>• plan effective activities and experiences in the LMS that will help you learn key chemistry concepts and wrestle with misconceptions.</li> <li>• provide timely feedback to guide your learning.</li> </ul>	<p><b>To be successful, you will:</b></p> <ul style="list-style-type: none"> <li>• check the LMS daily and complete the assigned activities in advance of the in-person sessions.</li> <li>• work the OWL problems daily, keep track of where you are having problems, and bring your questions to your discussion sessions.</li> </ul>
<p><b>Whole-class sessions</b></p> <p>Purpose: To interact as a whole class to engage with key chemistry concepts, clear up misconceptions, tackle challenges, and make connections.</p>	<p><b>To support your success, Chem 103 instructors will:</b></p> <ul style="list-style-type: none"> <li>• focus on the big concepts and how current material builds on previous ideas.</li> <li>• work through sticking points, misconceptions, and common challenges.</li> </ul>	<p><b>To be successful, you will:</b></p> <ul style="list-style-type: none"> <li>• attend and engage in all sessions, actively participate in the activities.</li> <li>• complete necessary readings, activities, and LMS components before each session and be sure to let us know if you do not understand a concept or have a question.</li> </ul>
<p><b>Discussion sessions</b></p> <p>Purpose: To practice problem solving, reinforce whole-session concepts, ask questions, make mistakes, and to learn from your peers in a small-group environment.</p>	<p><b>To support your success, Chem 103 TAs and FAs will:</b></p> <ul style="list-style-type: none"> <li>• provide structured opportunities for peer group work and collaborative problem solving.</li> <li>• apply the concepts, clarify any misunderstandings, and deepen your understanding.</li> </ul>	<p><b>To be successful, you will:</b></p> <ul style="list-style-type: none"> <li>• arrive ready to share ideas, make mistakes, learn from your TA/FA and your peers, and collaboratively problem solve.</li> <li>• participate in discussion activities and proactively make a list of questions based on challenges you encountered during your attempts to solve problems.</li> </ul>
<p><b>Labs</b></p> <p>Purpose: To explore principles of chemistry in a laboratory environment, learn basic laboratory skills, conduct experiments, and test hypotheses.</p>	<p><b>To support your success, Chem 103 TAs, FAs, and lab instructor will:</b></p> <ul style="list-style-type: none"> <li>• provide you the opportunity to explore chemical transformations in a hands-on environment.</li> <li>• teach you the basics of safe and effective laboratory manipulation.</li> </ul>	<p><b>To be successful, you will</b></p> <ul style="list-style-type: none"> <li>• come to laboratory prepared, actively participate in the activities, and work collaboratively with your lab partner to conduct the experiment.</li> <li>• effectively document the experiment in your lab notebook and the post-lab write-up.</li> </ul>

<p><b>Problem-solving sessions</b>          Purpose: To construct knowledge collaboratively, give and receive crucial feedback, share ideas and correct misconceptions, and help support each other in learning chemistry.</p>	<p><b>To support your success, Chem 103 instructors will:</b></p> <ul style="list-style-type: none"> <li>design effective peer work activities and provide time for peer group work.</li> <li>facilitate problem-solving sessions and provide guidance.</li> </ul>	<p><b>To be successful, you will:</b></p> <ul style="list-style-type: none"> <li>attend all problem-solving sessions and fully participate.</li> <li>use these sessions as opportunities to teach each other and to learn from each other.</li> </ul>
<p><b>Exams</b>          Purpose: To evaluate and provide feedback on the state of your understanding of chemistry concepts and their applications.</p>	<p><b>To support your success, Chem 103 instructors will:</b></p> <ul style="list-style-type: none"> <li>provide practice exams with their answer keys and write exams that are fair and accurately reflect the content.</li> <li>provide timely and clear feedback on your exam.</li> </ul>	<p><b>To be successful, you will:</b></p> <ul style="list-style-type: none"> <li>accurately and completely record your work on the exam during the exam.</li> <li>Prepare well in advance for the exam by solving a large number of problems, learning from each one.</li> <li>review your exam to identify any gap areas in your knowledge and skills and make a plan to reinforce your knowledge in these areas.</li> </ul>
<p><b>Individual and small-group study</b>          Purpose: To connect chemistry concepts, build problem-solving skills, and develop the study skills and habits of independent learners.</p>	<p><b>To support your success, Chem 103 instructors will:</b></p> <ul style="list-style-type: none"> <li>identify the key topics for your independent study.</li> <li>highlight additional resources to guide your study.</li> </ul>	<p><b>To be successful, you will:</b></p> <ul style="list-style-type: none"> <li>work a sufficient number of problems until you can easily, correctly, and repeatedly demonstrate their concepts and applications.</li> <li>teach each other and learn from each other.</li> </ul>

## Course resources

We have chosen course materials that best address the learning objectives and that are the most useful resources to you in your study, lab, and group work. There are seven total materials: one textbook, one lab manual, one lab notebook, safety goggles, iClicker, a calculator, and OWL online homework access. These items will cost you roughly \$200. These items are essential for your learning, and we have negotiated with the publishers to receive highly discounted textbook pricing. Please contact us if you cannot afford these items. Please see our course site for a list of the materials and options for purchasing the textbook/homework at a significant discount:

<https://learnuw.wisc.edu> (under Spring 2016 courses, find Chemistry 103)

## Chemistry 103 schedule

A link to our course schedule, including exam dates, can be found on the top of the Learn@UW course site under "Semester Schedule." You must report any religious conflicts with exams or laboratory exercises to your TA/FA within the first two weeks of classes.

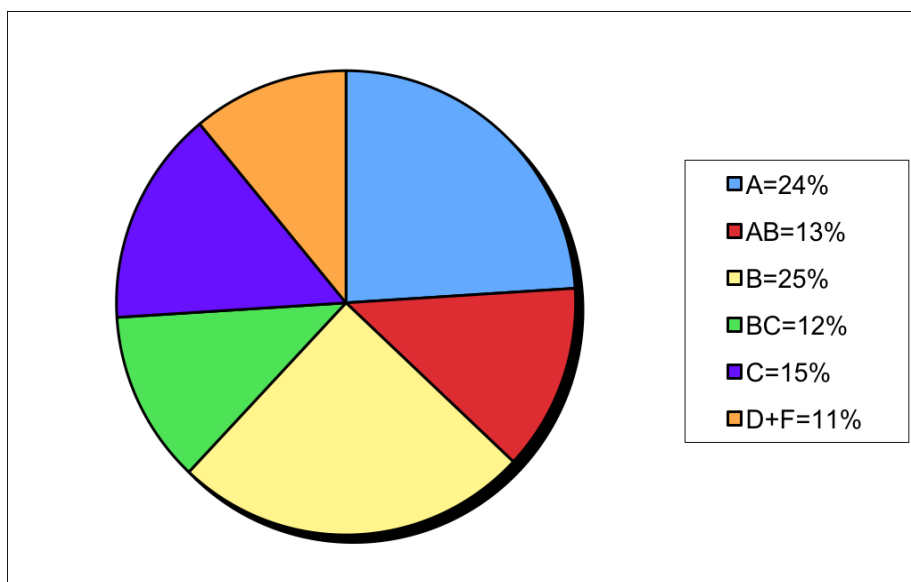
## Evaluation of your learning

Your scores are always available to you at our Learn@UW course site. There are no opportunities for extra credit. You must successfully complete the laboratory assignments to receive a passing grade in this course.

Three, 50-minute exams	36%
Online homework	15%
Laboratory	20%
Quizzes	3%
Clicker participation	2%
Final exam	24%
<b>Total</b>	<b>100%</b>

## Grade scale

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 our expectations. For example, we guarantee that at least 24% of the grades will be A, and it may be higher.



## Expectations in our learning environment

Chemistry 103 is a fun and enlightening course, and we enjoy teaching it. We owe each other professional behavior and mutual respect. Your instructors will model expected behavior and will refrain from inappropriate activities, such as being late to class, going off on irrelevant tangents, and ending class early. We will devote time and energy to helping you succeed in this class and to providing you opportunities to practice chemistry problem solving.

In return, you will need to be engaged, present, and active in this environment. Make notes about questions you have or points you don't understand. Come to us with your questions and struggles with the material; that's why we're here. **To succeed, you must practice chemistry problem solving every day! Please be prepared to commit 8 to 12 hours outside of class each week toward this effort.**

## Course and UW-Madison policies

### Academic Integrity

We expect all students to conduct themselves with honesty, integrity, and professionalism. Remember that it is not ok to simply copy and paste material from the Web or from another student into your own work. The Writing Center describes how to cite material that is not yours: <http://writing.wisc.edu/Handbook/QuotingSources.html>. Passing off someone else's lab reports or exam answers as your own work is academic misconduct. Asking a student to "click" concept test responses for you when absent from class is also academic misconduct. Such behavior is not tolerated and is grounds for a failing grade in this course. To learn more about university policies on academic misconduct, see <http://www.students.wisc.edu/doso/academic-integrity/>.

### Reasonable Accommodations

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility.

Students are expected to inform their instructor of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. We will work either directly with you or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.

## Communications

### Office Hours

Your Chemistry 103 instructors are dedicated to maximizing your learning experience. We rely heavily on you to take the initiative in coming to seek our help. That's where the office hours come in. In the past, the most successful students took good advantage of office hours on a weekly basis. They came with lists of questions and clearly identified problems that they needed help solving. This engagement led to great discussions and a very effective use of time. After the first week of class, we will post a list of all TA/FA office hours, and we encourage you to attend any of them, not just those of your TA/FA.

### Email

In order to help bring your email to our attention, please include **Chemistry 103** in the subject line of all email messages that you send us. If your last name begins with A-K, please email Professor Schmidt. If your last name begins with L-Z, please email Professor Nathanson. Email should be limited to logistical questions, concerns about grades, requests for alternate office hours, or any non-content related course questions. Content questions should be directed to your teaching assistant or discussed at your instructor's/teaching assistant's office hours.

## Student contract/compact

I have read the syllabus and understand the expectations of this Chemistry 103 learning environment. I understand that I am expected to contribute to a productive atmosphere, to show respect to my peers, to be responsible for my work and my preparation for deadlines, and to ask for clarification when I need it. I expect to participate fully in an engaging learning experience in Chemistry 103 and to optimize the learning opportunities available to me. Finally, I will contribute to positive classroom etiquette by:

- 1) being seated before the bell rings,
- 2) refraining from packing up until after the class is over, even if the bell has rung (this will not happen often), and
- 3) turning off my cell phone before class starts and not texting or checking my phone during class.

## CHEM 103/Schmidt and Nathanson CALENDAR

SPRING 2016

LAB DATES	Monday	Tuesday	Wednesday	Thursday	Friday	QUIZ DATES
17	18	19	20 First class	21	22 class	23 No quiz
24 Citizenship in the Lab	25 class	26	27 class	28	29 class	30 Quiz 1
31 Solutions, Density, Graphing	FEB 1 class	2	3 class	4	5 class	6 Quiz 2
7 Zinc + Iodine	8 class	9	10 class	11	12 Exam Prep	13 Quiz 3
14 NO LAB	15 Exam I	16	17 class	18	19 class	20 No Quiz
21 <i>Chemical Logic</i> (computer lab)	22 class	23	24 class	25	26 class	27 Quiz 4
28 Solution Calorimetry	29 class	MARCH 1	2 class	3	4 class	5 Quiz 5
6 NO LAB	7 class	8	9 class	10	11 Exam Prep	12 Quiz 6
13 Alum	14 Exam II	15	16 class	17	18 class	19 no quiz
20 NO LAB	21 Spring Break	22	23 Spring Break	24	25 Spring Break	26 no quiz
27 Light, Color, and Solutions	28 class	29	30 class	31	APRIL 1 class	2 Quiz 7
3 <i>Molecular Geometry</i> (computer lab)	4 class	5	6 class	7	8 class	9 Quiz 8
10 NO LAB	11 class	12	13 class	14	15 Exam Prep	16 Quiz 9
17 NO LAB	18 Exam III	19	20 class	21	22 class	23 No quiz
24 PROJECT LAB	25 class	26	27 class	28	29 class	30 quiz 10
MAY 1 <i>Window Solid State</i> (computer lab)	2 class	3	4 Last class	5	6 Final Exam prep	7 no quiz
8	9	10	103-1 Final Exam 12:25 - 2:25 PM	12	103-2 Final Exam 10:05 AM -12:05 PM	14



**Chemistry 103 Spring 2016**

**Topics**

<b>Week</b>	<b>Date</b>	<b>Class (Lecture Notes)</b>	<b>Topic (Lecture Slides)</b>	<b>Chapter</b>	<b>Lab</b>
1	18-Jan	1 (12:05, 2:25)	W Nature of Chemistry	1	No Lab
		2 (12:05, 2:25)	F Nature of Chemistry	1	
2	25-Jan	3 (12:05, 2:25)	M Chemical Compounds	2	Citizenship in Lab
		4 (12:05, 2:25)	W Chemical Compounds	2	
		5 (12:05, 2:25)	F Chemical Compounds	1.13/2	
3	1-Feb	6 (12:05, 2:25)	M Chemical Compounds	2	Solns/Dens/Graph
		7 (12:05, 2:25)	W Chemical Reactions	3	
		8 (12:05, 2:25)	F Chemical Reactions	3	
4	8-Feb	9 (12:05, 2:25)	M Chemical Reactions	3	Zinc and Iodine
		10 (12:05, 2:25)	W Chemical Reactions	3	
			F Exam Preparation		
5	15-Feb		<b>M Exam I (fixed date)</b>		Reaction Types and Chemical Logic
		11 (12:05, 2:25)	W Chemical Reactions	3	
		12 (12:05, 2:25)	F Chemical Reactions	3	
6	22-Feb	13 (12:05, 2:25)	M Energy and Chemical Reactions	4	No Lab
		14 (12:05, 2:25)	W Energy and Chemical Reactions	4	
		15 (12:05, 2:25)	F Energy and Chemical Reactions	4	
7	29-Feb	16 (12:05, 2:25)	M Energy and Chemical Reactions	4	No Lab
		17 (12:05, 2:25)	W Energy/Electron Configurations	5-Apr	
		18 (12:05, 2:25)	F Electron Configurations Periodic Table	5	
8	7-Mar	19 (12:05, 2:25)	M Electron Configurations Periodic Table	5	Solution Calorimetry
		20 (12:05, 2:25)	W Electron Configurations Periodic Table	5	
			F Exam Preparation		
9	14-Mar		<b>M Exam II (fixed date)</b>		Synthesis of an Alum
		21 (12:05, 2:25)	W Electron Configurations Periodic Table	5	
		22 (12:05, 2:25)	F Electron Configurations Periodic Table	5	
		23 (12:05, 2:25)	M Electron Configurations Periodic Table	5	Light, Color, & Solns

**Chemistry 103 Spring 2016**

**Topics**

11	28-Mar	24 (12:05, 2:25)	W Electron Configurations Periodic Table	5	
		25 (12:05, 2:25)	F Electron Configurations/Covalent Bond	6-May	
10	21-Mar		Spring Break		
12	4-Apr	26 (12:05, 2:25)	M Chemical Bonding	6	<i>Molecular Geometry</i>
		27 (12:05, 2:25)	W Covalent Bonding/Molecular Structure	6	
		28 (12:05, 2:25)	F Molecular Structure	7-Jun	
13	11-Apr	29 (12:05, 2:25)	M Molecular Structure	7	No Lab
		30 (12:05, 2:25)	W Molecular Structure	6.7/7	
			F Exam Preparation		
14	18-Apr		<b>M Exam III (fixed date)</b>		No Lab
		31 (12:05, 2:25)	W Molecular Structure/Gases	8-Jul	
		32 (12:05, 2:25)	F Properties of Gases	8	
15	25-Apr	33 (12:05, 2:25)	M Properties of Gases	8	Project Lab
		34 (12:05, 2:25)	W Solid State	9	
		35 (12:05, 2:25)	F Intermolecular Forces	7.6/9	
16	2-May	36 (12:05, 2:25)	M Intermolecular Forces/Liquids	7.6/9	Window on the Solid State*
		37 (12:05, 2:25)	W Liquids and Materials/Last Class	9	
			F Final Exam Preparation		
17	8-May		<b>S Final Exam, Lecture 1 7:25 - 9:25 PM (fixed!) T Final Exam, Lecture 2 2:45 - 4:45 PM (fixed!)</b>		No Lab