

CHEMISTRY 103

SUMMER 2016

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| Lecturer: | Dr. Linda Zelewski |
| Email: | zelewski@wisc.edu |
| Office: | Room Chemistry 7108 (Take the elevator in the lobby at the corner of Johnson St. and Charter St. up to the 7 th floor.) |
| Office Hours: | M 1:00-2:00 p.m. (in chem 7108) W 12:00-1:00 p.m. (in chem 7108) |
| Lecture: | MWF 8:55-10:10 a.m. in chem 1361 |
| Laboratory: | TuTh 8:55-11:55 a.m. in chem 1335 |
| Discussion: | Section 301 MWF 10:20-11:35 a.m. in chem 2377 Section 302 MWF 10:20-11:35 a.m. in chem 2381 |
| Website: | https://learn@uw.wisc.edu |
| General Chemistry Homepage: | http://genchem.chem.wisc.edu |
| Undergraduate Chemistry Office: | Chemistry 1328, 263-2424 |
| Chemistry Study Room: | Chemistry 1371 |
| Chemistry Computer Room: | Chemistry 1375 |

REQUIRED MATERIALS

Textbook: *Chemistry: The Molecular Science*, 5th 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 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 103 Learn@UW homepage.

Lab Manual: *Chemistry 103 Laboratory Manual*, Summer 2016, Department of Chemistry, UW-Madison (\$20, cash only), sold in the first floor chemistry stockroom.

Lab Notebook: Carbonless laboratory notebook with duplicate 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

Why take Chemistry 103?

Chemistry is the science of making things and transforming things. Chemistry is often called the central science because it connects so strongly to other sciences, among them physics, biology, engineering, medicine, materials science, and pharmacology. Chemistry 103 will meet a prerequisite requirement for many fields of study and careers. You will have an opportunity through Chemistry 103 to gain a new understanding of the complex world around you, and you will begin to learn how the many elements of the periodic table serve as building blocks of every substance and every process on earth and beyond.

How does this course fit with your preparation for your major?

Chemistry 103 is the first course in a two-semester General Chemistry sequence. The second course is Chemistry 104. Students who take Chemistry 103 should also plan to take Chemistry 104. The 103-104 sequence serves as a prerequisite for advanced courses such as Organic Chemistry and Analytical Chemistry and is required by many other majors (such as engineering, many biological and agricultural sciences, pre-health professions, and L&S breadth requirements).

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

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.

Components of Chemistry 103

| Activity and Purpose | To support your success, instructors will: | To be successful, you will: |
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| <p>Learn@UW and OWL To serve as the organizational hub for all activities in the course and prepare for in-person sessions during the week.</p> | <ul style="list-style-type: none"> • post assignments and due dates, schedules, lecture notes, PowerPoint slides, course handouts, announcements, and other materials. • provide timely feedback to guide your learning. | <ul style="list-style-type: none"> • check Learn@UW daily and complete assigned activities by their due date. • work OWL problems daily, keep track of where you are having problems and bring your questions to your discussion sessions. |
| <p>Lecture To interact as a whole class to engage with key chemistry concepts, clear up misconceptions, tackle challenges, and make connections.</p> | <ul style="list-style-type: none"> • focus on the big concepts and how current material builds on previous ideas. • work through sticking points, misconceptions, and common challenges. | <ul style="list-style-type: none"> • Attend and actively participate in all sessions. • complete reading assignments before each session and let us know if you do not understand a concept or have a question. |
| <p>Discussion To practice problem solving, reinforce lecture concepts, ask questions, make mistakes, and to learn from your peers in a small-group environment.</p> | <ul style="list-style-type: none"> • provide structured opportunities for peer group work and collaborative problem solving. • apply the concepts, clarify any misunderstandings, and deepen your understanding. | <ul style="list-style-type: none"> • arrive ready to share ideas, make mistakes, learn from your TA and your peers, and collaboratively solve problems. • participate in discussion activities and proactively make a list of questions based on challenges you encountered during your attempts to solve problems. |
| <p>Lab To explore principles of chemistry in a laboratory environment, learn basic laboratory skills, conduct experiments, and test hypotheses.</p> | <ul style="list-style-type: none"> • provide you the opportunity to explore chemical transformations in a hands-on environment. • teach you the basics of safe and effective laboratory manipulation. | <ul style="list-style-type: none"> • come to laboratory prepared, actively participate in the activities, and work collaboratively with your lab partner to conduct the experiment. • effectively document the experiment in your lab notebook and the post-lab write-up. |
| <p>Individual and Small-Group Study Purpose: To connect chemistry concepts, build problem-solving skills, and develop the study skills and habits of independent learners.</p> | <ul style="list-style-type: none"> • identify the key topics for your independent study. • highlight additional resources to guide your study. | <ul style="list-style-type: none"> • work a sufficient number of problems until you can easily, correctly, and repeatedly demonstrate their concepts and applications. • teach each other and learn from each other. |

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| <p>Exams To evaluate and provide feedback on the state of your understanding of chemistry concepts and their applications.</p> | <ul style="list-style-type: none"> • provide practice exams with their answer keys and write exams that are fair and accurately reflect the content. • provide timely and clear feedback on your exam. | <ul style="list-style-type: none"> • accurately and completely record your work on the exam during the exam. • prepare well in advance for the exam by solving a large number of problems, learning from each one. • review your exam to identify any gap areas in your knowledge and skills and make a plan to reinforce your knowledge in these areas. |
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EVALUATION OF YOUR LEARNING

Exams

There will be three mid-term exams given during the laboratory period, and one final exam. Mark these dates on your calendar now. ***NO MAKE-UP EXAMS WILL BE GIVEN.*** If you have a religious conflict with any of these exam dates, you must report the conflict to your TA within the first week of classes.

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| Exam 1 | Tuesday, June 28 |
| Exam 2 | Thursday, July 14 |
| Exam 3 | Thursday, July 28 |
| Final Exam | Friday, August 5 |

Online Homework (OWLv2)

The homework system gives hints and allows multiple attempts, each with feedback. You can log on multiple times to complete an assignment. Due dates for assignments will be posted on Learn@UW and OWL. ***No extensions to the due date will be given, and you will not receive credit for late submissions.*** 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 chem103hw@chem.wisc.edu with your name, course number, and a brief description of the problem. 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.

Your textbook is an excellent source of additional practice problems, and answers to selected problems are given at the back of the book.

Laboratory

Instructions for the labs and a description of the grading rubric are described in the lab manual. 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.

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

Grades

If no changes are made, the total number of points you can earn in this course is 800 points. The point distribution is detailed below. Minor adjustments may be made during the semester if needed. You will be advised of any changes.

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| Laboratory | 150 points |
| Homework | 100 points |
| Discussion Participation | 25 points |
| Lecture Participation | 25 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:

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

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

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| 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, meaning a student achieving 90% or greater will receive an A grade. 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 103 final grade distributions.

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

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.

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.

CHEMISTRY 103 COURSE AND UW-MADISON POLICIES

Attendance

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 one week 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 lecture, discussion or lab, inform your TA as soon as possible via email and make arrangements with your TA to make up the missed work.

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. Any student caught cheating on an assignment or exam will receive a grade of zero on the assignment or exam. A second infraction will result in an F for the 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, 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 first week of the semester, or as soon as possible after a disability has been incurred or recognized. We will work 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.

CHEMISTRY 103 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 Learn@UW.

| WEEK | DATE | LECTURE TOPIC | CH. | LAB |
|------|----------|-------------------------------------|------|---|
| 1 | M Jun 13 | Introduction and Measurement | 1 | Tu: Citizenship in the Lab |
| | W Jun 15 | Atoms, Elements, Molecules and Ions | 2 | Th: Solutions, Density and Graphing |
| | F Jun 17 | Atoms, Elements, Molecules and Ions | 2 | |
| 2 | M Jun 20 | Chemical Compounds and Reactions | 3 | Tu: <i>No Lab</i> |
| | W Jun 22 | Chemical Compounds and Reactions | 3 | Th: Reaction Types and Chemical Logic (Computer Exercise) |
| | F Jun 24 | Energy and Stoichiometry | 3 | |
| 3 | M Jun 27 | Energy and Stoichiometry | 3 | Tu: EXAM 1 |
| | W Jun 29 | Kinetic Theory | 8 | Th: Reaction of Zinc and Iodine |
| | F Jul 1 | Kinetic Theory | 8 | |
| 4 | M Jul 4 | <i>Independence Day-No Class</i> | | Tu: <i>No Lab</i> |
| | W Jul 6 | Kinetic Theory/ Thermochemistry | 8, 4 | Th: Synthesis of an Alum |
| | F Jul 8 | Thermochemistry | 4 | |
| 5 | M Jul 11 | Thermochemistry | 4 | Tu: Solution Calorimetry |
| | W Jul 13 | Nature of Energy | 5 | Th: EXAM 2 |
| | F Jul 15 | Nature of Energy | 5 | |
| 6 | M Jul 18 | Nature of Energy | 5 | Tu: Light, Color and Solutions |
| | W Jul 20 | Chemical Bonding | 6 | Th: Project Lab |
| | F Jul 22 | Chemical Bonding | 6 | |
| 7 | M Jul 25 | Molecular Geometry | 7 | Tu: Molecular Geometry and WebMO (Computer Exercise) |
| | W Jul 27 | Intermolecular Forces | 9 | Th: EXAM 3 |
| | F Jul 29 | Intermolecular Forces | 9 | |
| 8 | M Aug 1 | Phases of Matter | 9 | Tu: A Window on the Solid State (Computer Exercise) |
| | W Aug 3 | Phases of Matter/ Review | 9 | Th: Check out |
| | F Aug 5 | FINAL EXAM | | |