

Chemistry 103 Sec 005 – Fall 2015

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| Lecturer: | Prof. Martin Zanni |
| Office: | Room 8305L Chemistry |
| E-mail: | zanni@chem.wisc.edu |
| Phone Number: | 608-262-4783 |
| Office Hours: | Wed 1:30 – 3:30 pm & by appointment |
| Lectures: | Sec 005 MWF @ 8:50 am, Room 1351 |
| Labs: | Room 2317 |
| Course Website on Learn@UW: | https://learnuw.wisc.edu/ |
| Website for Homework: | http://login.cengage.com (after registering) |
| General Chemistry Office: | Room 1328 Chemistry |
| General Chemistry Homepage: | http://genchem.chem.wisc.edu/ |

INTRODUCTION

Chemistry 103 is the first course in a two-semester General Chemistry sequence, the second course being Chemistry 104. Chemistry 103 and 104 provide a general background concerning the principles and factual basis of chemistry and serve as a prerequisite for advanced chemistry courses, such as Organic Chemistry (341 or 343), Analytical Chemistry (327 or 329), and Inorganic Chemistry (311). We require that freshmen students place at least at the level of Math 113 before taking Chemistry 103. Most Chemistry 103 students have had some high school chemistry. If you have not, or if you experience any difficulty despite attending class and completing all assignments, you should contact me *early* in the semester.

REQUIRED MATERIALS

- ✓ **Textbook and Online Homework Package:** Chemistry: The Molecular Science, 5th Edition, with Owl.v2 Online Homework. Authors Moore and Stanitski. Publisher: Cengage. Hard Cover: ISBN 9781305431966 or Three Hole Punch: ISBN 9781305367487.
 - ✓ **An Owl.v2 account for access to on-line homework:** This is bundled with your new textbook. Instructions for registering are given on the course homepage on Learn@UW (<http://learnuw.wisc.edu/>).
- For instructions to enroll, go to:
You MUST use your UW email address when registering !!
Use your NetID in the "Student ID" field.
<http://login.cengagebrain.com/course/E-TWQN2XULESYG6>
- Problems with enrollment? Owl.v2 Technical Support:
<http://support.cengage.com/magellanweb/ClassLandingPage.aspx?optylId=1-200KJZG>
- ✓ **Free Class Handouts:** PowerPoint presentations with the most important figures from the textbook will be used extensively in this class. They will be made available to you on the Learn@UW (<http://learnuw.wisc.edu/>) course web page before being discussed in class. I suggest printing them prior to class. The slides have enough space for you to write down all of the information from the blackboard.
 - ✓ **Electronic RF "Clicker":** The lectures will make use of student "voting" on concept tests, surveys, and other questions. You will need to buy a radio-frequency (RF) i>Clicker (we support i>Clicker, i>Clicker+ and i>Clicker2, but not i>Clicker GO) and bring it to every lecture. The i>Clicker can be purchased at the University Bookstore. You cannot use a cell phone app for the i>Clicker.

- ✓ **Lab Manual:** *Chemistry 103 Laboratory Manual*, Fall 2015, Department of Chemistry, UW-Madison; sold in Chemistry building lobby by the chemistry fraternity Alpha Chi Sigma during the first two weeks of classes or at the first floor chemical stockroom. Cash only.
- ✓ **Lab Notebook:** 100-page carbonless lab notebook; sold with the lab manuals.
- ✓ **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 at local bookstores. *Contact lenses should not be worn in the laboratory* because fumes or splashes may be caught between them and your eye. Please inform your TA if you absolutely have to wear contact lenses in the lab. A complete list of safety rules can be found in the lab manual.
- ✓ **Calculator:** An inexpensive calculator having capabilities for square roots, logarithms, exponentiation (antilogarithms), and scientific notation is required. The calculator will be used on homework assignments, quizzes, exams, and in the lab. Graphing calculator and cell phone calculators are not allowed in the laboratories or on tests.
- ✓ **Recommended USB Drive:** A USB flash drive that holds 2 GB is highly recommended for laboratory data collection.

LECTURE AND DISCUSSION

Lecture: The lecture is not intended to describe or explain everything you will learn in the course; rather, it will highlight important areas to study and give you an opportunity to think about concepts and understand them further. PowerPoint presentations will be used extensively in this class; all the slides will be made available to you for printing on Learn@UW before they are being discussed in class. Although a set of lecture notes taken by a Teaching Assistant (TA) will be available on Learn@UW, these notes are meant to supplement, not replace, your own notes. Unless it has a touchscreen, you are strongly discouraged from using a laptop computer for taking notes, as you will need to draw graphs, reaction schemes, etc.

Please do not use a computer during class unless you are taking notes. It is rude and distracting to be surfing the web, playing video games, etc.. Please silence or turn off cell phones upon entering the lecture hall and do not talk on your phone, text, or read a newspaper during class.

You should expect to spend about 8-12 hours of studying outside of class each week. In order to keep up, it is essential that you study effectively and manage your time well. I recommend that you: 1) read the assigned material in the textbook before each class session, 2) attend class and take your own notes, 3) as soon as possible after class, re-read the textbook and modify your notes. 4) Work on homework problems far in advance of the due date. When you encounter problems that you cannot solve, refer to the textbook, your notes, a tutorial, or your fellow students. Forming a study group to work through problems is an excellent way to learn chemistry.

Demonstrations: We will have many chemistry demos in our class. Questions about demonstrations may appear on quizzes and exams. These questions will focus on understanding the demonstration, as opposed to memorizing a result. For example, I won't ask "What color was observed?". I will ask "Explain what was happening when the solution turned blue".

Textbook. The textbook supplements the lectures. It provides background material for the lectures and also works out many relevant examples. At the end of each chapter are a number of problems, and in the appendices are answers to selected problems.

Discussion Section: You will meet with about 22 of your classmates and your Teaching Assistant (TA) twice a week for discussion. During these meetings, you will discuss and solve problems related to the assigned readings and homework, learn about upcoming laboratory assignments, and have an opportunity to ask questions. You will benefit most from discussion if you have prepared ahead of time. You should have already read the relevant material and worked some problems. Bring specific questions to discussion, as it is a great opportunity for you to learn from your TA and fellow classmates.

Homework: Problem solving is a crucial aspect of this course. Most weeks are you expected to complete a homework assignment that will be administered online via the **Owl.v2** system. The deadline for homework assignments is typically Sunday night at 11:59 pm. Each homework assignment will have enough problems to earn 100+ points; you will receive full credit by accumulating at least 100 points. However, you are encouraged to work on additional problems even after you obtained 100 points. You can log on multiple times to complete the assignment. See Learn@UW for more information.

If you encounter technical difficulties with OWL.v2 pertaining to how answers are submitted/accepted or why you did not get credit for an answer that you later learned was correct, please send an email to chem103hw@chem.wisc.edu with your name, course number (103), and a brief description of the problem. There is a group of people dedicated to solving technical problems that will help you, but they cannot assist with scientific content questions.

Quizzes: Quizzes will be administered during the first 20 minutes of the second discussion period of most weeks. Missed quizzes may not be made up, except under extenuating circumstances. One quiz score will be dropped at the end of the semester when grades are determined (see below).

LABORATORY

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

- Using laboratory equipment properly
- Analyzing and interpreting data
- Designing experiments
- Working with others
- Communicating your ideas through discussions with others and writing lab reports

Note: *You must successfully complete the laboratory assignments to receive a passing grade for this course.*

Laboratory Assignments: There are a total of nine lab assignments (plus an introductory "Citizenship in the Lab"). While most of the labs are conducted in the laboratory, three of them are computer-based assignments completed outside the lab. Instructions for the labs and a description of the grading rubric are described in the lab manual. The lab schedule is included with the Course Schedule at the end of this syllabus.

Laboratory Preparation: In order to properly prepare for a lab, you need to i) read the instructions in the Lab Manual; ii) review relevant sections of your textbook if concepts are unclear; iii) view the appropriate ChemPages Laboratory Resources on the web (<http://www.chem.wisc.edu/content/genchem-laboratory>); and iv) write an introduction and procedural outline in your lab notebook. *If you fail to complete any of these steps you will NOT be allowed into the laboratory!*

Mandatory Quizzes Prior to First Lab: There is a Safety Quiz and an Academic Honesty Quiz on Learn@UW that you must complete with a perfect score before being admitted to the first wet lab.

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 may lead to you being ejected from the laboratory and receiving zero credit for the experiment. Shorts and sandals are not allowed in lab. You must wear closed toes shoes and safety goggles.

Attendance: You must attend all laboratory sessions unless you have a valid excuse. Make-ups can only be scheduled under rare circumstances. A grade of zero will be recorded for unexcused absences. If you need to miss a lab, notify your TA as soon as possible, preferably before the lab period.

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.

RESOURCES

Numerous resources are available to assist you with this course in particular or college life in general. It is up to you to take advantage of these valuable resources to ensure your success both in this course and at UW-Madison.

Your Instructors: *Your TAs and I are here to help you!* We all have regularly scheduled office hours and can also be contacted via email. Don't hesitate to contact me if you have questions or concerns about the course or the work you are doing. I will respond to all email messages (zanni@chem.wisc.edu) either directly at **4 pm** each day or, when appropriate, in the following lecture. I also welcome questions after lecture and I am available by appointment. Please include your TA's name and section number in all your emails.

Course Web-site and Learn@UW (<https://learnuw.wisc.edu/>): Our course website can be accessed via Learn@UW. The syllabus, schedules, office hours, TA lecture notes, course handouts, announcements, and grades will all be available on Learn@UW. Pre-lab quizzes will also be administered via Learn@UW. You should visit the site on a daily basis.

General Chemistry Web Site (<http://www.chem.wisc.edu/content/genchem-main/>): Resource materials for general chemistry students are available on the General Chemistry website. The computer laboratory exercises, ChemPages, and other lab resources are accessed via the "Materials for Labs" link.

Study Groups: You may collaborate with other students on homework assignments and laboratory discussion questions. While 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) for assignments.*

Tutoring Services: A number of tutoring resources are available on campus, some free and some for a fee. For more information, see our Learn@UW site or the General Chemistry home page <http://www.chem.wisc.edu/content/tutors>.

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 special accommodations for this class should schedule a confidential meeting with me as soon as possible to discuss arrangements.

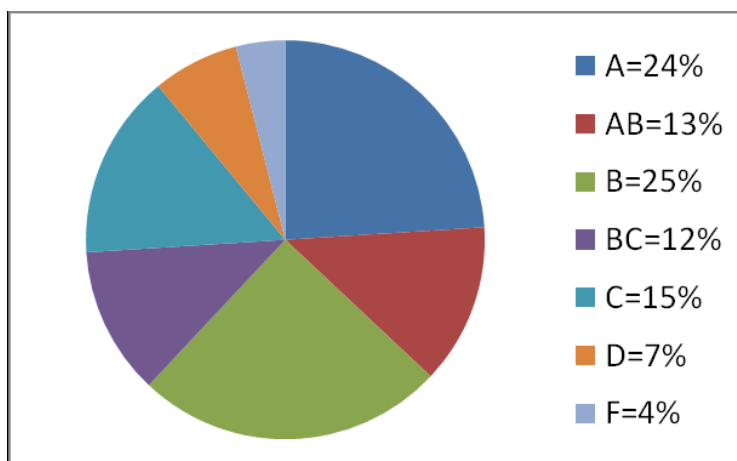
Advising and Counseling Services (University Health Services): College life can – and probably will – be stressful at times. If you are struggling with your academic course load or other academic issues, your advisor is a good resource. If you are struggling emotionally with anxiety, depression, or other health issues, individual counseling is available at University Counseling and Consultation Services. For more information go to their website (<http://www.uhs.wisc.edu/>) or call 265-5600. Crisis intervention services are also available 24 hours a day by dialing this same phone number and pressing option 9.

GRADES

Point Distribution: This course will be graded on a maximum of 860 points as follows:

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| Clicker Participation (>80% for full credit) | 50 points |
| Quizzes (best 10 of 11 @ 2 points each) | 20 points |
| 11 Homework Assignments (10 points each) | 110 points |
| Laboratory | 170 points |
| Online Course Survey at the end of the Semester | 10 points |
| 3 In-Class Mid-Term Exams (100 points each) | 300 points |
| Final Exam | 200 points |

Your final course grade will be based on your relative total of accumulated points compared to the rest of the class. The approximate distribution of final grades is given below. The top 24% of the scores will receive A's and so forth. It is important to note that the distribution will be adjusted upwards if class performance exceeds our expectations. Thus, you are not directly competing against other students. In fact, you are almost certain to earn a better grade if you work with, and help, other students. An important difference between this course and many high school courses is that the grades you receive on the exams, quizzes, homework assignments, and laboratories determine your final grade. One cannot improve this grade by performing additional work.



Approximate Distribution of Final Grades

Exams: There will be three mid-term exams given during our regular lecture period. The final exam will cover topics from the entire semester. Exam locations will be announced later. The exam schedule is:

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| Exam #1 | Monday, Sept. 28 | At class time, but room TBA |
| Exam #2 | Monday, Oct. 26 | At class time, but room TBA |
| Exam #3 | Monday, Nov. 23 | At class time, but room TBA |
| Final Exam | | |
| Sec 005 (8:50 am) | Friday, Dec. 18 | 12:25 p.m. – 2:25 p.m. |

Review Your Grades: Your grades will be available on the Learn@UW course website. Be sure to review your scores regularly and notify your TA promptly of any discrepancies. Do not wait until the end of the semester to request corrections.

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. Any student caught cheating on homework, a quiz, or lab (for instance, copying another person's work or fabricating data) will receive a zero for that assignment. A second infraction will result in an F for the course. More information on what constitutes academic misconduct and UW policies on handling misconduct can be at: <http://www.students.wisc.edu/doso/academic-integrity/>

Health or Disability Concerns. All students at UW are entitled to an accessible, accommodating, and supportive teaching and learning environment. The provision of reasonable accommodation for students with disabilities is a shared faculty and student responsibility. Students are expected to inform their professor of their need for accommodation; the professor and TA are expected to make the necessary arrangements. **If you have special needs, please make an appointment to speak to your professor and TA at your earliest convenience.** If you have a condition that might result in a seizure, loss of consciousness, or other situation that might endanger your safety or the safety of others in the laboratory, please inform your TA.

Desk numbers and E-mail addresses of TAs

| | | |
|---------|-----------------|--|
| Desk 31 | Leland Martin | lmartin@chem.wisc.edu |
| Desk 32 | Arya Baghkanian | baghkanian@wisc.edu |
| Desk 32 | Xinyi Li | xli646@wisc.edu |
| Desk 33 | Jessica Flach | flach2@wisc.edu |
| Desk 33 | Nyna Choi | uchoi@wisc.edu |
| Desk 34 | Dongyue Liang | dliang25@wisc.edu |
| Desk 34 | Haiyun Jin | hjin38@wisc.edu |
| Desk 16 | Linda Barry | ljbarry@wisc.edu |
| Desk 35 | Erin Duffy | eduffy@chem.wisc.edu |

Chemistry 103 (Zanni) – Course Schedule

| Week | Date | Topic | Text Chapters | Homework & Quiz | Lab | |
|------|----------|---|---------------|-----------------|---|------------------------|
| 1 | 2-Sep W | The Nature of Chemistry | 1 | <i>no HW/Q</i> | <i>no lab</i> | |
| | 4-Sep F | Atoms, Ions, and Ionic Compounds | 2.1 – 2.6 | | | |
| 2 | 7-Sep M | Labor Day – no class | | | HW1, Q1 | Citizenship in the Lab |
| | 9-Sep W | Molecular Comp. and Chem. Formulas | 2.7 – 2.12 | | | |
| 3 | 11-Sep F | Chemical Equations | 3.1 – 3.2 | HW2, Q2 | Solutions, Density & Graphing (wet lab) | |
| | 14-Sep M | Precipitation and Acid/Base Reactions | 3.3 – 3.4 | | | |
| | 16-Sep W | Oxidation/Reduction Reactions | 3.5 | | | |
| 4 | 18-Sep F | Stoichiometry and Percent Yield | 3.6 – 3.8 | HW3, Q3 | Reaction Types & Chemical Logic (computer lab) | |
| | 21-Sep M | Empirical Formulas and Molarity | 3.9 – 3.10 | | | |
| | 23-Sep W | Reactions in Aqueous Solutions | 3.11 – 3.12 | | | |
| 5 | 25-Sep F | Review for Exam 1 | | <i>no HW/Q</i> | <i>no lab</i> | |
| | 28-Sep M | EXAM #1: During Lecture Time. Rooms TBA →Covers Ch. 1–3 | | | | |
| 6 | 30-Sep W | Energy and Energy Transfer | 4.1 – 4.3 | HW4, Q4 | Zinc & Iodine (wet lab) | |
| | 2-Oct F | Heat Capacity and Enthalpy | 4.4 – 4.5 | | | |
| 7 | 5-Oct M | Reaction Enthalpies and Calorimetry | 4.6 – 4.8 | HW5, Q5 | Solution Calorimetry (wet lab) | |
| | 7-Oct W | Hess's Law and Formation Enthalpies | 4.9 – 4.11 | | | |
| | 9-Oct F | Electromagnetic Radiation | 5.1 – 5.2 | | | |
| 8 | 12-Oct M | Quantum Mechanical Model of Atom | 5.3 – 5.4 | HW6, Q6 | <i>no lab</i> | |
| | 14-Oct W | Atomic Orbitals | 5.5 – 5.6 | | | |
| | 16-Oct F | Electron Configurations | 5.7 – 5.8 | | | |
| 9 | 19-Oct M | Periodic Trends | 5.9 – 5.10 | HW7, Q7 | Synthesis of an Alum (wet lab) | |
| | 21-Oct W | Periodic Trends and Born-Haber Cycle | 5.11 – 5.13 | | | |
| | 23-Oct F | Catch-Up & Review for Exam 2 | | | | |
| 10 | 26-Oct M | EXAM #2: During Lecture Time. Rooms TBA →Covers Ch. 4–5 | | <i>no HW/Q</i> | <i>no lab</i> | |
| | 28-Oct W | Lewis Structures | 6.1 – 6.3 | | | |
| | 30-Oct F | Multiple Bonds and Bond Properties | 6.4 – 6.7 | | | |
| 11 | 2-Nov M | Formal Charge and Resonance | 6.8 – 6.11 | HW8, Q8 | <i>no lab</i> | |
| | 4-Nov W | Molecular Shapes and VSEPR Model | 7.1 – 7.2 | | | |
| | 6-Nov F | Valence Bond Theory | 7.3 – 7.4 | | | |
| 12 | 9-Nov M | Molecular Orbital Theory | Handouts | HW9, Q9 | Mol Geom and WebMO (comp lab) <i>Due Friday</i> | |
| | 11-Nov W | Polarity and Intermolecular Forces | 7.5 – 7.7 | | | |
| | 13-Nov F | Ideal Gas Law | 8.1 – 8.3 | | | |
| 13 | 16-Nov M | Gas Properties and Reactions | 8.4 – 8.6 | HW10, Q10 | Light, Color and Solutions (wet lab) | |
| | 18-Nov W | Kinetic Molec. Theory and Real Gases | 8.7 – 8.12 | | | |
| | 20-Nov F | Catch-Up & Review for Exam 3 | | | | |
| 14 | 23-Nov M | EXAM #3: During Lecture Time. Rooms TBA →Covers Ch. 6 - 8 | | <i>no HW/Q</i> | <i>no lab</i> | |
| | 25-Nov W | Problem Solving | | | | |
| | 27-Nov F | Thanksgiving Break - no class | | | | |
| 15 | 30-Nov M | Intermolecular Forces & Vaporization | 9.1 – 9.3 | HW11, Q11 | Project Lab (wet lab) | |
| | 2-Dec W | Types of Solids and Phase Diagrams | 9.3 – 9.4 | | | |
| | 4-Dec F | Water | 9.5 | | | |
| 16 | 7-Dec M | Crystalline Solids and Network Solids | 9.6 – 9.7 | | | |
| | 9-Dec W | Materials Science | 9.8 – 9.11 | | | |
| | 11-Dec F | Catch-up & Problem Solving | | | | |
| 16 | 14-Dec M | Review for Final Exam | | | | |
| | 18-Dec F | Sec 005 (8:50 am) Friday Dec. 18 12:25 p.m. – 2:25 p.m. →Covers Ch. 1–8 (~70%) and Ch. 9 (~30%); Rooms TBA | | | | |