Chemistry 103: General Chemistry I

Summer 2019, Lecture section 001

Course site: *https://learnuw.wisc.edu*
Bookmark this course site – it is important to visit daily! It is the hub for our course and contains crucial materials for each day of class.

Meeting times and locations: Whole Class M – F at 8:55 – 11:55 am in 2190 Grainger

- Discussion sections meet at various times and locations
- Labs meet at various times and locations

Instructor: Hassimi Traore

- Office hours: Monday, Tuesday and Wednesday from 12:00 to 1:00 Room 1201 Chem department Desk #21.

Preferred contact:

- Personal or confidential matters: use email (*traore@wisc.edu)*

Teaching Assistants: *use email to set up appointments*

Person		email
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Official course description:
Introduction. Stoichiometry and the mole concept, the behavior of gases, liquids and solids, thermochemistry, electronic structure of atoms and chemical bonding, descriptive chemistry of selected elements and compounds, intermolecular forces. For students taking one year or more of college chemistry; serves as a prerequisite for Chem 104; lecture, lab and discussion.

Official requisites: *Suitable math placement score or completion of Math 112, Math 114, Math 171 or equivalent; not open to students who have taken CHEM 109 or 115*
Course designations and attributes:

- Level: Elementary
- Breadth: Physical Science
- L&S Credit type: C

Instructional mode: Chemistry 103 is taught in a "blended" learning environment, meaning students interact with course content, instructors, and peers via in-person classroom time and online learning and engagement platforms.

How credit hours are met: Chemistry 103 is a 4-credit course. In-person contact time per week includes 150 minutes of whole-class session meetings, 50 minutes of discussion meetings, and (most weeks) 180 minutes of laboratory. Online

work per week includes approximately 3 hours of pre-class and lab preparatory work, 3 hours of post-class homework, and up to an additional 6 hours problem solving and exam study time. During the course of the semester, students are expected to engage with the course learning activities for a total of about 180 hours.

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 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 objectives

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. Describe fundamental chemical concepts and principles, including: measurement, characterization of the phases of matter, properties of atoms and ions, stoichiometry and thermochemistry of chemical reactions, kinetic molecular theory, the nature of energy, chemical bonding and molecular geometry, and intermolecular forces.
2. Solve a wide variety of integrative chemistry problems that connect ideas across topics, such as the evaluation of the impact of different fuels on the environment.
3. Apply models of atoms, molecules, and their interactions to explain the physical and chemical macroscopic properties of gases, liquids and solids.
4. Visualize and apply chemical and mathematical models to rationalize the organization of the periodic table, to predict molecular geometry, to explain chemical reactivity, and to calculate energy flow in chemical processes.

5. Design, conduct, and analyze experiments pertaining to stoichiometry, thermochemistry, and spectrometry while developing fundamental safety, measurement, and sample isolation techniques.
6. Demonstrate growth as reflective, self-directed learners through assessing their work, identifying misconceptions, and critically evaluating information from a variety of sources.
7. Articulate the rationale behind experimental results and answers to conceptual problems in verbal communications and written assessments using scientifically appropriate language.

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.

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 (*Chemistry, The Molecular Science 5th Edition* (2015), by Moore and Stanitski), one lab manual, one lab notebook, safety goggles, Top Hat, 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 Module 0 on our course site for a list of the materials and options for purchasing the textbook/homework at a significant discount: *https://learnuw.wisc.edu.*

Chemistry 103 schedule

A link to our course schedule, including exam dates, can be found on the course site under "Semester Schedule" and in Module 0. You must report any religious conflicts with exams or laboratory exercises to your TA/FA within the first two weeks of classes.

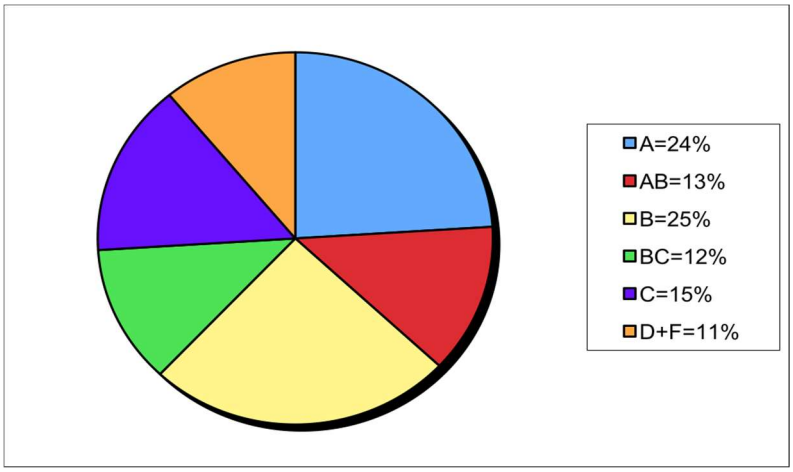
Evaluation of your learning

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	33%
Pre-class activities	7%
Post-class activities (online homework)	10%
Laboratory	20%
Quizzes (in discussion sections)	7%
Top Hat participation (ConcepTests)	3%
Final exam	20%
Total	**100%**

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, approximately 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 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.

See Module 0 on our course site for more information on course expectations and helpful tips for maximizing your learning.

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

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. After the first week of class, we will post a list of all TA/FA office hours, and we encourage you to attend Chem 103 Help Desk hours (listed on our course site).

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. 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 Piazza or discussed at your instructor's/TA's office hours.

More policies, expectations, and details in Module 0 on our course site.

Student contract

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) using my phone for Top Hat only during class, not texting or checking my phone for other reasons.

You will be asked to agree to this contract in Module 0 on our course site.

Chemistry 103 Topics and Schedules

A list of modules, assigned readings, and laboratory experiments for all Chemistry 103 sections is provided here. More specific details and dates for modules and assignments can be found on the course websites.

Module Number	Module Title	Number of Class Periods	Assigned Readings (textbook and online)
1	Introduction and Measurement	2	Chapter 1, PDF readings
2	Atoms, Elements, Molecules and Ions	3	Chapters 1, 2
3	Chemical Reactions	3	Chapter 3
4	Energy and Stoichiometry	4	Chapters 2-4; PDF readings
5	Gases	3	Chapter 8; PDF readings
6	Thermochemistry	5	Chapter 4; PDF readings
7	Light, Matter, and Atomic Structure	6	Chapter 5; PDF readings
8	Chemical Bonding	3	Chapter 6
9	Molecular Geometry	4	Chapter 7
10	Intermolecular Forces	3	Chapter 9
11	Phase Diagrams and Solids	3	Chapter 9

Laboratory Experiments

Citizenship in the Lab
Solutions, Density, and Graphing
Reaction Types and Chemical Logic
Zinc and Iodine
Synthesis of an Alum
Solution Calorimetry
Light, Color, and Solutions
Molecular Geometry and WebMO
Project Lab

Proposed Chemistry 103 Summer 2019 Schedule

week		date	Whole Class Meeting (Monday – Friday unless meeting for a wet lab) 8:55 - 11:35 am (2190 Grainger)		Lab (Tuesday or Thursday) 8:55 - 11:55 am (1335 Chem)	TA present		HW due at 8:30am
						Mary	Tom	
1	M	17-Jun	M0, M1Q1-2: Course policies, Intro to Chem	*Amazing Calculator Race* *M1T1:prefixes, unit conversions*	x	x	x	
	T	18-Jun	M1Q3 Chemical & Physical Properties	*M1T2: Density (8:55-10:15 am)*	Cit Lab (10:30 am)	x	x	
	W	19-Jun	M2Q1-3: Structure of atom, Mass Spec	*M2T1: subatomic particles, M2T2: MS*	x		x	x
	R	20-Jun	x		SDG	x	x	
	F	21-Jun	M2Q4-6: Mass Spec, Naming Compounds	***Quiz #1;*** *M2T2: Mass Spec, Naming Race*	x	x		
2	M	24-Jun	M3Q1-2: Solubility	*Chem Logic Lab prep*	x	x		x
	T	25-Jun	M3Q3-4: Acid/Base/Neutral; Gas-forming	*M3T1: Sol, Acid/Base, Gas-form*	x		x	
	W	26-Jun	M3Q5-6: Redox	*M3T2: Redox*	x	x		
	R	27-Jun	Reaction Types and Chemical Logic - supported online activity			x	x	x
	F	28-Jun	M4Q1-2: Moles, Stoichiometry	***Quiz #2;*** *M4T1: moles, %comp, stoich*	x		x	
3	M	1-Jul	M4Q3-4: Limiting Reagents; Empirical Form	*M4T2: limiting reagents, empirical formulas*	x	x		
	T	2-Jul	**Catch up and review (8:55 - 10 am); Exam 1: Modules 1-4, Labs (10:15 - 11:55 am)**			x	x	x
	W	3-Jul	M4Q5-6: Energy; Solution Stoichiometry	*M4T3: Energy, Solutions*	x		x	
	R	4-Jul	*4th of July (no class)*					
	F	5-Jul	M5Q1-3: Ideal Gas Laws, Gas density	*M5T1: Ideal gases, stoichiometry*	x	x		x
4	M	8-Jul	M5Q4-6: Gas Mixtures, partial pressure, KM	*M5T2: Density, Partial Pressure* *M5T3: Energy, Temp, Speed*	x	x		
	T	9-Jul	x		Zinc and Iodine	x	x	
	W	10-Jul	M6Q1-2: Energy, Heat (q), System vs Surro	***Quiz #3;*** *M6T1: Scaling Energy, Heat (q)*	x	x		x
	R	11-Jul	M6Q3-6: 1st Law; Ht Cap; Calorimetry	*M6T2:Heat Capacity, Calorimetry, Work* *M6T3: Heating Curve*	x		x	
	F	12-Jul	M6Q7-8: Hess's Law; Enthalpy of Formation	*M6T4:Hess's Law, Enthalpy of formation*	x	x		
5	M	15-Jul	M7Q1-4: Waves, Photons, Photoelectric Effect, Emission Spectra	***Quiz #4*** *; M7T1: Photons E, Photoelectric;* *M7T2: Emission Spectra, e- transitions*	x		x	x
	T	16-Jul	x		Solution Calorimetry	x	x	
	W	17-Jul	**Catch up and review (8:55 - 10 am); Exam 2: Modules 5-7a, Labs (10:15 - 11:35 am)**			x	x	x
	R	18-Jul	M7Q5-7: Matter waves, Q#s, Orbitals, e- cor	*M7T3: Matter Wave, QN, orbitals*	x	x		
	F	19-Jul	M7Q8-10: e- config, periodic trends	*M7T4: Electron Config, Z-effective* *M7T5: Periodic Trends, Ionic Config*	x		x	
6	M	22-Jul	M8Q1-3: Bonding, Lewis Structures, Resona	***Quiz #5;*** *M8T1: Lewis Structures; electrone*	x	x		x
	T	23-Jul	M8Q4: Bond length, Bond Strength	*M8T2: Resonance; Formal Charge* *M8T3: Bond Enthalpy*	x		x	
	W	24-Jul	M9Q1-2: VSEPR, Molecule polarity	*M9T1: VSEPR, molecule polarity*	x	x		x
	R	25-Jul	*Web MO - supported online activity*			x	x	
	F	26-Jul	M9Q3-4: Valence Bond Theory	*M9T2: VBT*	x		x	
7	M	29-Jul	M9Q5-6: MO Theory	***Quiz #6;*** *M9T3: MO theory*			x	x
	T	30-Jul	x		Light, Color, and Solutions	x	x	
	W	31-Jul	**Catch up and review (8:55 - 10 am); Exam 3: Modules 7b-9, Labs (10:15 - 11:35 am)**			x	x	x
	R	1-Aug	x		Synthesis of an Alum	x	x	
	F	2-Aug	M10Q1-3: IMF & Physical Properties	*M10T1: Intermolecular Forces*	x	x		
8	M	5-Aug	M10Q4; M11Q1-2: Phase Diagrams	*M10T1: Intermolecular Forces* *M11T1: Phases*	x		x	
	T	6-Aug	x		Project Lab	x	x	x
	W	7-Aug	M11Q3-4: Unit Cells (Primitive)	*M11T1: Phases* *M11T2: Solids*	x	x		
	R	8-Aug	M11Q5-6: Unit Cells (BCC, FCC); stoich	***Quiz #7;*** *Catch Up and review*	x		x	
	F	9-Aug	**Comprehensive Final Exam (Modules 1-11, Labs)**			x	x	x

last updated: 6/4/2019