Principles Of Chemistry 120

Hamilton College / Fall 2022

Class Meetings
Section 01, 9:00 am MWF, Taylor 3024
Section 03, 11:00 am MWF, Taylor G027

Course Materials
- Chemistry: An Atoms-Focused Approach, 3rd Edition, WWNorton, 2020
- Laboratory notebook and lab coat available at the bookstore
- Laboratory PPE (safety glasses, gloves) available from your lab instructor
- Lecture and laboratory materials available on Blackboard as the semester proceeds

Meet With Me
Links, times, changes, and additional hours posted on Blackboard

- **Individual Appointments** can be made through Calendy; if the posted times conflict for you, please email me for an alternate time
- **Open Student Hours** Sunday and Thursday evenings via Zoom
- **Email Message Hours** Monday & Wednesday evenings

At any time, if my office door is open, please come in!

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Principles of Chemistry 120 is a one-semester course to introduce you to the central ideas and theories of chemistry, broadly falling into a study of the physical interactions and chemical reactions of matter. It is the first course in the sequence for chemistry for those students interested in science majors (chemistry, geoscience, biology, physics, and neuroscience) and pre-professional students (health professions and engineering).

At the end of Chem 120 you should be able to...

- describe and explain the fundamental properties of atoms and molecules
- differentiate between the types of chemical bonding and use bonding theories to predict molecular structure
- distinguish between the types of chemical reactions and calculate amounts of reaction products
- explain how the interactions between atoms and molecules result in the phases of matter and apply it to the behavior of gases
- predict whether a chemical reaction is likely to take place, how fast it will go, and how much product will form
- understand chemical equilibrium processes in aqueous solution

This course has been designed with all of Hamilton's educational goals in mind

Disciplinary Practice. You will begin to think like a chemist

Intellectual Curiosity and Flexibility. There will often be more than one way to solve a problem

Analytic Discernment. You will analyze graphical information and equations

Creativity. In the lab you will design experiments and explore how to best represent and interpret your data

Communication and Expression. You will practice writing concise technical summaries on lab reports and tests

Aesthetic Discernment. The shapes of molecules have beautiful symmetries and the application of mathematics in solving chemical problems is often elegant

Ethical, Informed, and Engaged Citizen. You will gain fundamental understanding of our molecular world and strengthen your evidence-based reasoning skills

Understanding of Cultural Diversity. Modern science is a broadly diverse and international enterprise that benefits from a vast number of perspectives. There are very few places as diverse as modern science laboratories

You must earn a passing grade (> 60%) in both the tests and in the laboratory in order to pass Chem 120. Test scores and the overall course grade are not graded on a curve

90–100% A– to A+
80–89% B– to B+
70–79% C– to C+
60–69% D– to D+
< 60% F

Assignments will be graded as "mastery" or "no credit" with each assignment specifying what is needed for mastery. The percent "masteries" you earn will determine your assignment grade: 90+% mastery = A, 80+% mastery = B, and so forth)

Tests will be graded out of 130 points. Each test will cover 2–3 topics allowing you to focus your study

There will be about six **Laboratory Experiments** to complete which will be worth 20% of your final grade. More details about the lab will be given by your lab instructor

How This Course Works

Class Attendance is expected, but not required. If you must miss because of illness or other pressing reason, please follow up to find out what you missed with a classmate and me

In Class Meetings you can expect a mix of taking notes, working examples, and answering "clicker" questions. You should come prepared having done some textbook reading to preview the day's topics and be prepared to be engaged in the class

Assignments will take the form of frequent Questions-of-the-Day which will give you timely practice on solving problems and expand your understanding of class material. Occasional Cumulative Problems will give you practice in connecting different aspects of chemistry topics you are learning. You are encouraged to collaborate with each other on assignments, but the work you turn in for a grade must represent your own understanding.

Tests will be given in the evenings to allow you time to think without undue time pressure. There will be four tests scheduled throughout the semester with the fifth test given during the final exam period. The last test will not be cumulative, but will only cover the final topics in the course. You will be given up to three hours to complete each test, but you may not need all that time.

Test 1	Thursday Sept 15 6:30 pm
Test 2	Tuesday Oct 11 6:30 pm
Test 3	Wednesday Nov 2 6:30 pm
Test 4	Wednesday Nov 16 6:30 pm
Test 5	9am section Tuesday, Dec 13 7:00 pm
	11am section Wednesday, Dec 14 7:00 pm

Knowing that there will be conflicts for orchestra, choir, sports, and work-study with the scheduled evening tests, accommodations will be made if you have a direct conflict with the scheduled test times. In some instances you could start the test later or schedule into an available time earlier in the day or during the next day. The final test cannot be rescheduled unless you have a direct conflict with another exam or you have two other scheduled exams that same day. Please do not make travel arrangements that conflict with any of the test times.

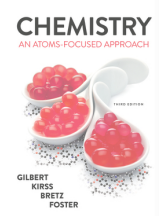
During tests, a standard scientific/graphing calculator will be allowed along with an equation sheet which will be specified for each test. No other electronic devices will be permitted including notebook computers, tablets, mobile phones, smartwatches, or other data-saving/ text-messaging electronic devices.

You will have fifteen **oops tokens** throughout the semester. You can use these for either assignments or tests. One token will allow you to submit a late assignment, resubmit a "no-credit" assignment for "mastery" before the answers are posted, or correct one test question answer (for explaining diagrams or a problem) on each of the first four tests to earn back up to half of the missed points. You will have two days after a due date to submit late work using a token, no explanation is required; due dates for resubmissions of assignments and test corrections will be posted on Blackboard.

Tools For Success

Blackboard is your central information source for this course, please check it frequently throughout the semester

- course announcements and calendar
- syllabus and course study tips
- lecture notes, assigned readings, and suggested practice problems
- answers to on-your-own questions
- answers to assignments and tests
- links for appointments and Zoom open student hours
- links for iclicker, Gradescope, and Piazza tools
- and more!



Your textbook is a great resource! It has detailed explanations of concepts and definitions that you didn't completely catch in class along with captions for the figures shown in class meetings. Preview a topic so that you have a jump on the vocabulary and types of example problems that might be done in class. Review by working some problems at the end of the chapters.

The types of **iClicker** questions we will have in the class might include
…a check on your understanding concepts from class and textbook
…predicting an answer based on previous topics
…answering based on equations or graphs
…asking what you find enlightening or confusing

For clicker questions, please bring your computer, tablet, or smartphone to class everyday. Instructions for the app are posted on Blackboard

Piazza is our course wiki-style Q&A platform where you can ask course-related questions and get answers added to and edited by other students in the class and your professor.

Gradescope will be used to submit your assignments and through which you will also be able to see feedback on your assignments and tests.

Throughout this course, please ask questions often and early. Get into the habit of thinking about how you are thinking about course material and how you approach problem solving. Consider for assignments and tests where you do well and where you might need to invest more time and get support.

Need to request accommodations for your learning? I am happy to work with you to try my best to establish a productive and potentially less frustrating learning environment. If you are eligible to receive an accommodation and would like to make a formal request for this course, please discuss it with me during the first two weeks of class. You will need to provide Allen Harrison, Associate Dean of Students (Elihu Root House, ext. 4021) with appropriate documentation of your disability. That being said, if do not have formal documentation, and you are struggling in ways that I might be able to suggest different strategies or arrangements so that you can better reach the course learning goals, please do not hesitate to ask. You might find that our conversation is helpful on your other courses as well!

Overwhelmed, Anxious, or Depressed?

There are many resources available on campus to help and support you

- Counseling Center (ext. 4340) offers many services including a 24-hour hotline
- Sara Solomon, Associate Dean of Students for Student Support, 315-859-4600; ssolomon@hamilton.edu
- Adam Van Wynsberghe, Associate Dean of Students for Academics, 315-859-4600; avanwyns@hamilton.edu
- Me, your faculty/ALEX advisor, RA, and Area Director in your residence hall

If at any time you feel suicidal or in danger of harming yourself or others, please reach out for support! The Hamilton community cares and is available to help. Campus Safety is available 24/7 for urgent concerns at 315-859-4000.

Frequently Asked Questions

Can I use my computer in class? I will allow tablets (preferable) and laptops in class, but ask those using them to sit on the right side of the classroom facing the front. Please keep your tasks on your device to those for our class meeting so as to not be distracting to those around you (even to me in the front).

What do I need to bring to class? I will post lecture "outline notes" in pdf form before our classes which I encourage you to print out before class. We will be doing "clicker questions" quite often so also bring your smartphone, tablet, or computer to access iClicker Cloud. You do not ever need to bring your textbook.

How do I use student open hours and appointments? Students frequently use this time clarify concepts or an assignment, and to inquire about study strategies. You have an open invitation to meet with me about anything course related (and things that aren't!) either individually or with friends.

How do I ask for an extension on an assignment? We all get behind, often temporarily. That's why we have oops tokens; no explanation is required for an extension. If you find that you are always late on assignments or have a major life event that is interfering (that happens too!), let's meet to find a way to help you catch up so that you can do your best in this class.

What if a test or important class falls on a religious holiday? I am happy to accommodate your schedule needs for your observance and traditions, just ask.

Are there any opportunities for extra credit? The short answer is no. Oops tokens give you the opportunity to correct assignments and certain test questions and are a better way for you to master the topics in this course.

Academic Honesty

I take seriously the responsibilities of Hamilton's Honor Code for both me as your instructor and you as the student. Unwavering integrity in your work will likely be very important in your future profession. I approach this aspect in my classes with trust in you and with respect for the course's learning environment. If I suspect any potential violation of the honor code, it is my duty to report it to the Chair of the Honor Court and the Associate Dean of Students for Academics with whom then we can sort out what might have occurred.

The rules concerning the Academic Honor Code are described in Article 3, section 2 and 3, of the Honor Court Constitution. Please read this, especially sections that describe cheating, plagiarism, and collaboration.

The Honor Code pertains to all assignments that you submit for a grade (including questions-of-the-day, cumulative questions, pre-lab assignments, and lab reports) and the tests. You are encouraged on assignments to discuss with others potential strategies for answering questions and solving problems in order to teach and learn from each other, but the work you submit must be your own application of those strategies. A near "carbon copy" of your friend's test, assignment, or lab report or requesting/copying answers from a web "tutoring" site, even to a small degree, will result in a referral to the honor court. If you find yourself questioning whether an action could violate the Honor Code, it is likely that it does.

Tentative Class Meeting Schedule (with chapter sections and test cut-offs)

August 26	Introduction to the Course	1.1–1.9	
August 29, 31	Atoms, Ions, and Molecules	2.1–2.6	
September 2, 5, 7, 9	Atomic Structure	3.1–3.12	Test 1 Material
September 12, 14, 16	Chemical Bonding	4.1–4.8	
September 19, 21, 23, 26	Bonding Theories	5.2–5.5, 5.7	
September 28, 30, October 3	Intermolecular Forces	6.1–6.5	Test 2 Material
October 5, 7	Stoichiometry	7.2–7.6	
October 10, 12, 17	Reactions in Aqueous Solutions	8.1–8.7	
October 19, 21, 24, 26	Properties of Gases	9.1–9.10	Test 3 Material
October 28, 31, November 2	Thermochemistry	10.1–10.7	
November 4, 7, 9,	Thermodynamics	12.1–12.7	Test 4 Material
November 11, 14, 16	Chemical Kinetics	13.2–13.6	
November 18, 28	Chemical Equilibria	14.1–14.10	
November 30, December 2, 5	Acid-Base Equilibria	15.1–15.9	
December 7, 9	Buffers & Titrations	16.2–16.5	Test 5 Material