

<b>Time/Location:</b>	MWF, Benedict 207 10:00-10:50 AM
<b>Professor:</b>	Michael A. Welsh SCCT 1075 mwelsh@hamilton.edu
<b>Office Hours:</b>	Monday, 1 – 3 pm Wednesday, 3 – 5 pm Thursday, 10 am – noon or by individual appointment (email to schedule)
<b>Required Textbook and Supplies:</b>	<i>Chemistry: An Atoms-Focused Approach</i> , 4 <sup>th</sup> Edition by Gilbert, Bretz, Bliem, Curtis, and Kirss  Lab Coat and Notebook  Scientific Calculator

<b>Digital Resources</b>	<u>Blackboard</u> – all course documents will be posted here. Check often!  <u>Gradescope</u> – you will submit homework problem sets here.
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### Course Objectives

Chem 120: Principles of Chemistry is a one-semester, general chemistry course that will introduce you to the physical and chemical properties of matter. At the end of the semester, you should be able to...

- Describe the fundamental make-up of atoms and molecules.
- Differentiate between types of chemical bonding and predict molecular structure.
- Explain how molecular structure relates to the physical properties of bulk matter.
- Identify different types of chemical reactions.
- Predict if a chemical reaction will take place, how fast it will go, and how much product will form.

### Alignment with College Goals

Disciplinary Practice – you will learn the fundamentals of chemical science and begin to think like a chemist.

Intellectual Curiosity and Flexibility – there will often be more than one way to solve a problem, and there will be many opportunities to dive deeper into sub-areas that interests you.

Analytic Discernment – you will analyze graphical information and equations.

Communication and Expression – you will write concise technical summaries of your laboratory procedures, data, and conclusions.

Aesthetic Discernment – the shapes of molecules often have significant symmetry and structures that some might call beautiful.

Ethical, Informed, and Engaged Citizenship – a fundamental understanding of our molecular world will strengthen your evidence-based reasoning skills and make you a more discerning citizen.

Understanding of Cultural Diversity – modern science is an international enterprise that benefits from diverse experiences and perspectives. There are very few places as diverse as modern science laboratories!

**Assignments and Grading**

Your overall grade will be calculated as follows:

3 Mid-Term Tests	42% (14% each)
Test 4	18%
Homework	20%
Laboratory	20%

An overall average of 60% or higher is required to pass the course. *You must pass the lab portion of the course to pass Chem 120 overall (lab failure = course failure).*

**Tests** – Mid-term tests will be given from 7 to 9 pm on the dates below. Test dates will not change even if we lag behind my target pace of lecture. Look out for detailed instructions regarding the content you are responsible for as a test date nears. Test 4 will occur during our scheduled exam time in finals week. This test will be cumulative but with an emphasis on material covered at the end of the course.

Test 1: Thursday, September 25  
Test 2: Thursday, October 23  
Test 3: Thursday, November 20  
Test 4: Finals Week; Tuesday, December 16, 7 pm

If you have a direct conflict with these dates due to other classes, orchestra, choir, sports, or work-study programs, tests can be taken at a common alternate time. Please inform me of conflicts as far in advance as possible so that alternate arrangements can be made. See below for additional information regarding Chemistry Department test policies.

**Homework** – Your homework grade will come from two sources. The first is problem sets that I will assign most weeks. Problem sets will be relatively short and will contain “stretchy” problems that will help you prepare for tests. You will turn in homework by scanning and uploading a PDF to Gradescope on the indicated due dates, typically Monday evenings. Homework problem sets will be graded for accuracy, but with generous partial credit, provided you are demonstrating effort. The second is “Chem Skills” worksheets that you will complete as part of laboratory tutorial sessions. Collectively, these worksheets will count as the equivalent of one problem set when totaling your homework grade. Chem Skills worksheets will be marked for completion only. Other homework policies are...

- Collaboration with your classmates on all homework problems is allowed but remember that it is in your best interest to tackle problems on your own before working with others.
- I will grant short extensions for illness or personal emergencies (not conflicts with other courses, see below), but you must *notify me in advance of the due date*.
- I understand that assignments, exams, papers, etc. can pile up at certain times and that this causes stress. I will grant you one homework “punt” at any point in the semester. The punted homework will not count toward your overall grade; you do not have to turn it in. You may punt a homework at any time by emailing me *before* the homework due date.

**Laboratory** – The laboratory component of the course will account for 20% of your grade. A lab coat and notebook are required, and you can purchase both in the Hamilton bookstore. Refer to your Chem 120 Lab instructor and their syllabus for detailed information about this component of the course.

**Additional Course Policies and Information**

**Lecture and Attendance** – It is in your best interest to be at lecture, but attendance is not required. If you must miss class, I recommend that you obtain notes from a classmate, check Blackboard for any posted slides/notes/worksheets, and read the corresponding sections of the textbook. Then follow up with me at office hours if you don't understand something. All lecture slides will be made available on Blackboard before class for your use in note taking, and I will post my personal lecture notes for your use in content review. Check Blackboard frequently for updates.

**Textbook** – Any format of the Gilbert textbook is acceptable, but you do need to buy or rent it. Hardback textbooks are available for purchase in the campus bookstore. The Ebook textbook can be purchased directly from the publisher at <https://www.norton.com/books/9781324073321>. Course content will generally follow the flow of the book, and I suggest that you supplement class lectures with reading the corresponding textbook chapters.

On the Hamilton bookstore website, you will see a second book called *Calculations in Chemistry*. This book is optional, but it can be a useful study resource, especially for those who have never taken a chemistry course or for those who may want additional practice with the quantitative aspects of chemistry.

**Practice Problems** – Learning chemistry requires doing many practice problems on your own. Do not start the graded homework sets cold turkey! You should begin by solving “drill” problems that will familiarize you with chemistry calculations and review key concepts. There are three sources for such problems.

- 1) Your textbook contains *many* practice problems at the end of each chapter. A list of suggested problems is on Blackboard to help you organize your work. Answers to odd-numbered problems can be found in an appendix in the back of the book. A solutions manual that contains detailed answers to all problems can be purchased online from the publisher.
- 2) The *Calculations in Chemistry* text contains guided lessons and practice problems focusing on essential quantitative chemistry skills. If you did not take chemistry in high school, these problems would be a great starting point for your study.
- 3) I have posted “Extra Problems” and answer keys to Blackboard. These are simply additional problems that I have compiled from various sources.

**Office Hours** – I will be in my office at the times indicated above, but you can consider me available for questions any time that I am in my office with the door open. Please drop in if you need my help! If you cannot meet with me during the posted times, or want to talk privately, I am always available by appointment (email me to schedule).

**TA Hours** – Want a time to solve practice problems, such as those found in the textbook (not graded homework) with some help nearby? Pull up to our Chemistry TA hours where a senior Chem major will be present to help answer your questions. Look out for more information early in the semester.

**Chemistry Department Testing Policies** – All Chemistry exams at the 100- and 200-level are proctored by a professor or student TA. Cell phones are collected at the start of exams, and no materials, other than those allowed, are permitted at your desk. All students must use their own calculator. Students must take exams on the scheduled day and time, with the following exceptions.

- For students with conflicts on exam nights, common make-up exams will be offered on a limited number of dates/times determined by the Department. Please inform me of conflicts as far in advance as possible, at least 48 hours before the scheduled exam, so that a make-up time can be arranged.
- For students experiencing severe illness or other emergency, alternate arrangements will be made on a case-by-case basis. Email me to coordinate.

- Accommodations for students with documented disabilities will be made. I will reach out to students with approved accommodations for extra time and/or reduced distraction testing to coordinate policies prior to our first exam.
- I recognize that there may be times during the semester that you have an overwhelming amount of work. If you find yourself in this situation during a test week, you may request permission to take the test during one of the common make-up times. Requests should be made no fewer than three days prior to the test. Only one such request will be granted per semester.

**Honor Code** – I take issues of academic misconduct very seriously, and Hamilton College's honor code applies in full to this course. Working with other students on homework is encouraged, but your work must be your own; do not simply copy answers from your peers. Using artificial intelligence tools to generate text or numerical answers is not allowed on any assignment you submit for a grade. No form of collaboration via in-person or electronic means is allowed during tests. Please refer to your laboratory syllabus for guidelines on that part of the course.

**Academic Accommodations** – The College provides support for any students with disabilities. To request an academic accommodation, contact Allen Harrison (aharriso@hamilton.edu), Assistant Dean for Accessibility Resources, to verify eligibility and coordinate services. Students with approved academic accommodations should notify me within the first two weeks of the semester to allow time for proper implementation. All conversations will be confidential.

### Anticipated Lecture Schedule

Week	Dates	Topic	Text Chapters	Events
1	Aug 29	Course Introduction	Chap 1	
2	Sep 1-5	Atomic Structure	Chap 2,3	
3	Sep 8-12	Atomic Structure	Chap 3	
4	Sep 15-19	Chemical Bonding	Chap 4	
5	Sep 22-26	Chemical Bonding; Bonding Theory	Chap 4,5	<b>Test 1</b>
6	Sep 29-Oct 3	Bonding Theory	Chap 5	
7	Oct 6-10	IMFs, Stoichiometry, Solutions	Chap 6,7,8	
8	Oct 13-15	Gases	Chap 9	<i>Fall Break</i>
9	Oct 20-24	Thermodynamics – Enthalpy	Chap 10	<b>Test 2</b>
10	Oct 27-31	Thermodynamics – Entropy and Free Energy	Chap 11	
11	Nov 3-7	Redox, Electrochemistry	Chap 8,17	
12	Nov 10-14	Chemical Kinetics	Chap 13	
13	Nov 17-21	Chemical Equilibrium	Chap 14	<b>Test 3</b>
	Nov 24-28	<i>No Class – Thanksgiving Break</i>		
14	Dec 1-5	Acid-Base Equilibria	Chap 8,15	
15	Dec 8-12	Acid-Base Equilibria	Chap 16	
Finals	Dec 16	<b>Test 4, 7 pm – 10 pm</b>		