

CHE 121: Chemical Principles I

Block 6 2018-19

Professor

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Office hours: official office hours are 1-3 pm every day you are not in lab; unofficially, just stop by anytime.

Laboratory Instructor

Diane Gingerich Feil

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Quantitative Reasoning Studio

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Cole Library 322

<http://www.cornellcollege.edu/library/ctl/qr/>

Tutors

Penny Peng YPeng21@cornellcollege.edu

We will have at least one more tutor available too.

Catalogue description

Fundamental concepts of chemistry, mole concept, energy, theories of the atom and the chemical bond, and molecular geometry. This course is intended primarily for those considering a major in science. (Laboratory Science)

Who should take this course?

This course is intended primarily for science majors and those needing chemistry for pre-professional studies related to health care or engineering. In addition, this course is intended for those exploring the possibility of a science major or pre-professional studies.

Course overview

This course provides a foundation for your study of chemistry and related sciences. Most students will go on to take CHE 122 Chemical Principles II, and together these courses cover all the introductory topics in chemistry. Topics in CHE 121 include atoms, the central role of electrons, the periodic table, bonding, periodic properties, molecules, phases, reactions, stoichiometry, and thermochemistry.

Course goals and objectives

The overarching goal of this course is to provide a broad but rigorous introduction to a variety of topics that will be useful to you in future chemistry and biology courses. The theme running through the course is to lay a strong foundation for future study.

Chemists deal with the above topics every day, but these concepts are also crucially important to other branches of science. In addition to learning these fundamental principles in chemistry, you will develop your problem solving and laboratory skills.

With the above in mind, specific learning objectives include but are not limited to the following. Students will be able:

- To model and describe chemical systems using fundamental chemical, physical, and mathematical ideas
- To analyze experimental data in order to understand behaviors of atoms and molecules
- To evaluate limitations in experimental data and assumptions in models
- To evaluate chemical systems using logical and quantitative reasoning
- To develop specific lab skills appropriate to this course and to work safely in lab
- To effectively explain ideas in both oral and written form
- To collaborate with other students in class team work and in lab
- To reflect on their learning and their interactions with the material and other students
- To do all the above while demonstrating respect for others and their ideas, both formally (e.g., proper citations) and informally (e.g., not talking over each other in teams)

This class emphasizes the following Educational Priorities and Outcomes of Cornell College: knowledge, inquiry, reasoning, and communication. See <http://www.cornellcollege.edu/about-cornell/mission/index.shtml>.

Texts and other materials

Required:

- 1) Chemistry: A Guided Inquiry, 7th edition, by Moog and Farrell; ISBN 978-1-119-11070-5
 - You need to buy this edition of this text and bring it to class every day, including the morning of Day 1.
 - While it may be possible to buy an e-book, I recommend a new (not used or rented) printed copy because this is a workbook-style text.
- 2) Chemistry: The Science in Context, 4th edition, by Gilbert, Kirss, Foster, and Davies; ISBN 978-0393124187 or the equivalent e-book
 - You are welcome to buy the 4th edition (which should be cheap online) or, if you like, the 5th edition. You do NOT need to buy a SmartWork electronic homework card or code for this class.
 - Paper or e-book is up to you.
 - You will use this text again in CHE 122.
- 3) scientific calculator that will handle logs and exponents
 - A graphing calculator is fine but not necessary.
 - Cell phone calculators are NOT allowed in this class at any time.
- 4) lab notebook such as [this one](#) or the 100 page version of this
 - You will use this in subsequent science classes as well.
- 5) safety goggles
 - Purchase these from the Chemistry Stockroom for \$10.
 - You will use these in subsequent science classes as well.

Optional: Student Solutions Manual for Chemistry: The Science in Context

Meeting times, format, and expectations

Class meets each day from 9:00 – 11:00 am and most days from 12:30 – 3:00 pm. There will be a review and problem solving session at 8:30 am most days. Most afternoons are labs. For most labs, we will divide the class in half, and when your lab group is not in session you can retake quizzes or visit me during office hours in the afternoon. See below for more details and a complete schedule.

This class is based on a specific type of team work (more details to follow) with supplemental lectures as necessary. I expect prompt attendance at all class sessions, and this is reflected in how I score the class. I also require active and constructive participation in teams, and you will get more from the class if you are more involved.

Usually, we will introduce a topic or subsection of material in class before you need to read your text on that topic. You are encouraged to read the appropriate sections of your text thoroughly, usually after class. I recommend reading the text more than once, and reading a science textbook includes more than just looking at the words. Read, take notes on the reading, re-read, work

example problems (actually work them, not just read them), and test yourself on the concepts by working end-of-chapter problems.

Working end-of-chapter problems is crucial to your success in this course. In addition to the graded assignments listed below, it will be to your great advantage to do and understand the representative problems from the text. These will be posted on Moodle. I will be happy to discuss these problems in detail, but these problems are not to turn in. These are for your own benefit; it is essential that you be able to solve problems in chemistry. Working together on problems is appropriate and even encouraged; science is a collaborative endeavor. However, for quizzes and exams each of you should understand all of these problems.

Grading

Grading in this course is based on mastery of skills. Your course grade will be determined completely by the number of skills you master. In most cases, mastery of a skill is defined at the 80% level. For example, on a five-question quiz, you must get at least four answers completely correct to demonstrate mastery. In many cases, you get multiple attempts to demonstrate mastery. Once mastery is demonstrated, you do not need to take another quiz on that skill again, even on an exam. What follows is a description of the different categories of skills in this course.

Core Content Skills (CCS): These are based on specific content in the course. There will be one CCS for most team activities in the course. Almost always, a CCS is first assessed in an online quiz through Moodle. If mastery is not demonstrated in the Moodle quiz, you may retake the quiz—this time on paper—for this CCS at the following times: between 1-3 pm when your lab group is not in session; during exams. In all cases, you must wait at least one day before attempting the quiz for that CCS again. There are 24 CCS in the course.

Ancillary Content Skills (ACS): These are also based on specific content in the course. For some team activities in the course (i.e., those that do not have a CCS), there will be one ACS per activity. Each ACS is only assessed as a quiz within an exam. If you do not master an ACS on the exam, you can retake the quiz for that ACS on the next exam(s). There are 12 ACS in the course.

Integrated Content Skills (ICS): ICS quizzes assess your ability to pull together ideas from different CCS and perhaps ACS. They require you to use multiple pieces of information and/or multiple techniques to solve a problem. Each exam (including the final exam) will have one ICS quiz within it. You get one chance at each ICS; there is no retaking any ICS quiz. There are 4 ICS in the course.

A note on exams: Exams are nothing more than packets of individual quizzes: one quiz per CCS you have not passed yet, one quiz for each new ACS, one quiz for each old ACS you have not passed yet, and one ICS per exam.

Lab Skills (LS): The LS focus exclusively on your performance in the lab portion of the course. Diane will provide more information about how she will assess LS. There are 15 LS in the course. One more stipulation: you must pass the lab to pass the overall class.

Writing and Reflection Skills (WRS): There will be short writing assignments where you will reflect on your own learning or a journal article and write a short response. To pass each WRS, you must follow all assignment parameters, including submitting the assignment on time. You get one chance at each WRS; there are no re-dos on these. There are 3 WRS in the course.

Taking Care of Business Skills (TCBS): You demonstrate these skills in the following ways: attending class, being on time for class, and participating meaningfully in your teams (including fulfilling team roles). There are 2 TCBS available in the class. You can lose TCBS: If you are absent more than once, you will lose 1 TCBS. If you are late to class more than twice, you will lose 1 TCBS. If you demonstrate counterproductive behavior on your team, you will lose 1 TCBS.

Optional Bonus Skills (OBS): We will have at least one science/math speaker on campus this block. If you attend and complete a short writeup, you are eligible for 1 OBS.

Summary:

24	CCS
12	ACS
4	ICS
15	LS
3	WRS
2	TCBS
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60	Total skills, plus 1 OBS

Grading scale

Skills passed	Letter grade	Skills passed	Letter grade	Skills passed	Letter grade
54	A	46	B-	38	D+
52	A-	44	C+	36	D
50	B+	42	C	34	D-
48	B	40	C-	33 or fewer	F

Miscellaneous course policies

Late work will not be accepted, and makeup exams will not be given. If you need to miss class, let me know ahead of time; if the reason is good the class session might be excused at my discretion. Please contact me if you are having difficulty with the course or if a serious sickness/incident occurs during the block.

Electronic mail is an official form of communication at Cornell College, and College policy requires everyone to check his/her College email address at least once per day. I will often communicate with you via email and it is your responsibility to be aware of these communications.

Cell phones cannot be used for any reason (including a quick check to see who just texted you) during class or office hour times. Do not use your phone as a calculator or to look up data or information on the web unless specifically instructed to do so. Turn it off and put it in your bag under the table. It's OK—you'll survive. If you use a laptop or similar device to take notes, you should be using it *only* for class work. I reserve the right to restrict the use of any electronic device.

Any student with a situation which could affect your learning (e.g., health condition, serious family trouble) must contact me by the third day of the term. Student Affairs staff members do not automatically notify faculty members concerning student health issues. Health conditions include but are not limited to asthma or similar breathing issues, seizure disorder, pregnancy, known chemical sensitivities, etc. You must inform me due to safety concerns in the lab.

Students wishing to do a 15th day drop must complete all assignments and participate in class. See <http://catalog.cornellcollege.edu/content.php?catoid=3&navoid=74#adding-and-dropping-courses>, Item 7.

If medical or psychological conditions arise during the block, please consult with me, and/or with a medical or psychological health provider, *before* your progress in the course may become impeded. If such concerns make the completion of this course or an incomplete (I) infeasible, you may petition for a health withdrawal (WH). Be aware that Cornell counselors and health professionals will not normally issue support for a WH unless you have consulted them at or near the onset of the problem. See <http://catalog.cornellcollege.edu/content.php?catoid=3&navoid=74#adding-and-dropping-courses>, Item 9.

Cornell College makes reasonable accommodations for persons with disabilities. Students should notify the Coordinator of Academic Support and Advising and their course instructor of any disability related accommodations within the first three days of the term for which the accommodations are required, due to the fast pace of the block format. For more information on the documentation required to establish the need for accommodations and the process of requesting the accommodations, see <http://www.cornellcollege.edu/academic-support-and-advising/disabilities/index.shtml>.

I will provide reasonable accommodation for those students whose religious observances may intersect with planned class activities. You must see me within the first three days of the term to arrange any accommodation.

As mentioned above, working on homework sets (as well as lab exercises) together is appropriate. However, academic and scientific misconduct will be dealt with harshly. Examples include, but are not limited to, 'collaborating' on exams, illegal material stored in your calculator, submitting

another's work as your own, and falsification of lab data. **Any** question about what is (or is not) appropriate in academia or science should be directed to me. If there is any doubt at all then please ask. Here is the College's statement on Academic Honesty: Cornell College expects all members of the Cornell community to act with academic integrity. An important aspect of academic integrity is respecting the work of others. A student is expected to explicitly acknowledge ideas, claims, observations, or data of others, unless generally known. When a piece of work is submitted for credit, a student is asserting that the submission is her or his work unless there is a citation of a specific source. If there is no appropriate acknowledgement of sources, whether intended or not, this may constitute a violation of the College's requirement for honesty in academic work and may be treated as a case of academic dishonesty. The procedures regarding how the College deals with cases of academic dishonesty appear in the Catalogue, under the heading "Academic Honesty." See <http://catalog.cornellcollege.edu/content.php?catoid=3&navoid=74#academic-honesty>.

Schedule

Below is a tentative schedule of topics. We may need to adjust this schedule, which does not bother me at all, but the exams will be at the times indicated. There are a number of topic orders appropriate for general chemistry; we will generally follow the Moog & Farrell order. Details on which sections of the textbook match up will be provided on Moodle.

- Day 1: Mon 11 Feb 9 am: class
 12:30 pm: class, algebra review, CCS #1 quiz (in class)
- Day 2: Tues 12 Feb 8:30 am: WRS #1 due via upload to Moodle
 8:30 am: optional review and problem solving
 9 am: class and lab check in for both lab groups
 12:30 pm: lab for Lab Group A
 1 pm: office hours for Lab Group B
 ~3 pm: CCS #2 etc. quizzes open on Moodle, open until 8:00 am
- Day 3: Wed 13 Feb 8:30 am: optional review and problem solving
 9 am: class
 12:30 pm: lab for Lab Group B
 1 pm: office hours, quiz retakes for Lab Group A
 ~3 pm: more CCS quizzes open on Moodle, open until 8:00 am

Other days are similar, alternating afternoons in lab, with the following notes and exceptions:

- Day 6: Mon 18 Feb 9 am: Exam 1
 1:30 pm: class
- Day 9: Thurs 21 Feb 12:30 pm: lab for both lab groups A and B
 4 pm: chemistry seminar speaker (reception at 3:30 pm): OBS opportunity
- Day 10: Fri 22 Feb 12:30 pm: class
- Day 11: Mon 25 Feb 9 am: Exam 2
 1:30 pm: class
- Day 16: Mon 4 Mar 9 am: Exam 3
 1:30 pm: lab for both lab groups A and B
- Day 17: Tues 5 Mar 9 am: finish material, lab check out, course evaluations, review
 1 pm: office hours, last quiz retakes
- Day 18: Wed 6 Mar 9 am: Final Exam