

Syllabus for CHM 206: General Chemistry II Laboratory

R • RGSB 121 • 11:00 AM–1:45 PM (Section BB) • Spring 2019

<http://freitag.creighton.edu/CHM206>

Instructor: Dr. Mark Freitag
email: freitag@creighton.edu
office: Hixson-Lied Science Building 263

Office Hours: Monday: 8:00–11:00 AM, 12:30–4:00 PM
Tuesday: 10:00–11:00 AM, 2:00–4:00 PM
Wednesday: 8:00–11:00 AM, 12:30–2:00 PM
Thursday: 8:00–11:00 AM, 2:00–4:00 PM
Friday: 10:00–11:00 AM, or by appointment

I *will* be in during scheduled office hours for drop-in questions, but I am more than happy to see you anytime you find me in the office.

Course Description: Laboratory portion of CHM 205; experiments relevant to the content of CHM 205 are performed. This includes solution chemistry, kinetics, equilibrium, thermodynamics, and electrochemistry.

Learning Objectives: By the end of the course, students will be able to:

1. collect and interpret data collected electronically.
2. analyze data graphically and perform calculations in a spreadsheet program.
3. use the gas laws and experimental measurements to determine the molar mass of a gas.
4. create a Beer's Law plot and use the molar absorptivity to calculate concentrations from absorbance measurements.
5. determine reaction kinetics from experimentally collected data.
6. convert between $[\text{H}_3\text{O}^+]/\text{pH}$ and $K_a/\text{p}K_a$.
7. determine an equilibrium constant experimentally.
8. perform acid-base titrations.
9. collect a titration curve for a polyprotic acid and then identify the species present and the pH of the equivalence and half-equivalence points.
10. choose a salt and prepare a buffer solution of a target pH.
11. calculate thermodynamic quantities from experimentally collected data.
12. experimentally measure cell potentials and relative reduction potentials.

Pre/Co-Requisite: CHM 205: General Chemistry II (co-requisite). If you drop CHM 205, you may be required to drop this class as well. Please meet with me to discuss your options.

Location: RGSB 121 (the General Chemistry Lab).

Required Materials:

- Laboratory manual (\$15)
- Lab notebook with numbered, bound pages and carbon-less copies (\$15)*
- Safety glasses (\$5)*
- Non-programmable calculator

*You will likely have these from CHM 204. If you need to replace them, however, they will be available from the stockroom (RGSB 122) at the price listed. Lab manuals are only available through the stockroom; stockroom hours will be announced when known.

TAs:

- Kajal Desai
- Allie Morrow
- Denise Torres

Each section will have undergraduate TAs to aid with safety and to help answer questions and provide tips in the lab. Each TA will work closely with four of the stations in the lab; please take the chance to get to know the TAs and ask them any questions you might have during the lab. Outside of lab time, however, their time is their own, and any questions you might have should be directed to the instructor.

Disability Accommodations: If you have a disability and wish to discuss academic accommodations, please bring a letter from the Office of Disability Accommodations (ODA) to my office hours. **Accommodations are not retroactive**, so it is best to discuss this as early in the semester as possible.

Blueline: Unlike most sections of CHM 206, our section **will not** use Blueline for quizzes or posting course materials.

Course Communication: All official course communication will take place via e-mail to your Creighton University account and announced in class, if possible. It is your responsibility to check your e-mail regularly and to ensure that your inbox is empty enough to accept incoming e-mails.

E-mail is the best way to reach me for administrative matters, such as informing me you will be absent, or to make an appointment to meet with me. You can expect that I will answer e-mails within 24 hrs (36 hrs on breaks and weekends); I will often reply faster.

Office hours (including appointments) are the best way to discuss material. They are also the only time I will discuss grades or grading issues. If you have questions about material, please bring your work! I cannot answer the question ‘*what am I doing wrong?*’ if I don’t know what you’ve done!

University Closure: In the event the university announces an official closure, you may assume that labs that start *during* the closure will not meet. Labs that start *before* an early closure should plan to meet for the length of time the university is open. This syllabus will then be subject to change. This may include changes to grade weighting, the order or content of experiments, due dates, or the method in which instruction is delivered. Such changes will be announced via e-mail as soon as known. [Some examples: If the university closes at 12:30 PM for inclement weather, come to our 11:00 AM lab. You would then likely collect your data in lab, but leave early and finish the analysis and writeup at home. If the university closes at 11:00 AM or earlier, we will not meet at all, but a dry lab (a worksheet-based “lab” that you could do at home) might be assigned via e-mail and due the following week.]

Attendance: A quiz will be given at the beginning of each regular lab period. If you arrive late, but while the quiz is still being given, you will be allowed to use the remainder of the time to complete the assessment. If you arrive after it has been collected and the pre-lab lecture has started, you will be counted *absent* and will not be allowed to perform the experiment, as you have missed relevant announcements, safety and procedural information for the experiment. *Any absence*, with the exception of absences related to University-sanctioned activities, will result in a zero for that day’s lab report and quiz/mini-exam. Your single lowest lab report score and quiz score will be neglected in the calculation of your final grade (see below) so consider carefully when/if you miss the lab. Absences for University-sanctioned activities may only be made up if you contact me at least one week in advance to make

arrangements to attend another lab section and provide documentation (a note, e-mail, or memo from a Creighton faculty or staff member documenting the reason for your absence and explicitly stating that arrangements should be made for you to make it up.) **Missing three or more experiments may result in an F for the course.**

Grading Scheme: There are three components of your grade in this class:

Weekly Quizzes:

(10 pts each: 12 assigned, top 11 scores count)

At the beginning of most regular lab periods after the first, a closed-book/closed notebook quiz will be given, covering material from the previous lab, the one you are doing that day (if applicable), and even some general lab skills. You will have about ten minutes to complete the quiz. Continuing to work on the quiz after time has been called will result in a score of zero on that quiz. Your lowest score will be dropped in the calculation of your final grade.

Lab Work:

(25 pts each: 12 assigned, top 11 scores count)

Each lab report is worth 25 points, and your lowest lab report score will be dropped in the calculation of your final grade. The format for the lab reports is discussed in an additional handout. All lab reports are due at the end of the laboratory period.

Final Quiz:

(20 pts)

Details about your last quiz will be given in class towards the end of the semester; it will be cumulative, covering your understanding of the learning objectives for this course.

Final Grade Assignments: 405 points are possible in this class, broken down as follows:

Item	Points
Weekly Quizzes	11 @ 10 pts each = 110 pts
Lab Work	11 @ 25 pts each = 275 pts
Final Quiz	1 @ 20 pts = 20 pts

Final course grades will be assigned based on the following point scale. (For example, a score of 369 will earn a B+, but 370 or higher will be an A. Final grades will be rounded to the nearest point.)

A	B+	B	C+	C	D
370	350	330	310	290	250

Creighton defines letter grades as follows:

- A *outstanding achievement and an unusual degree of intellectual initiative*
- B+ *high level of intellectual achievement*
- B *noteworthy level of performance*
- C+ *performance beyond basic expectations of the course*
- C *satisfactory work*
- D *work of inferior quality, but passing*
- F *failure—no credit*

Returned Work, Regrades, etc. Work will typically be returned at the next lab period. It is *your* responsibility to double-check the accuracy of all grades as soon as an assignment is returned. In addition to the actual points assigned for a problem, this should include double-checking the addition of points. You have *ten days* after a lab report or quiz is returned to dispute a grade by bringing the assignment *to my office* (or making the appointment to do so). I will then regrade the entire assignment and assign the new grade, whether higher or lower. You are *always* welcome (and encouraged!) to talk to me about how something was graded before committing to a regrade.

You should keep all returned work in all courses until after your final grade is in and you are sure your grade was calculated correctly.

Academic Honesty: Academic dishonesty, in any form, will not be tolerated. Links to the full policy of the Creighton College of Arts and Sciences, a full discussion of what constitute academic dishonesty, and the formal policies are available on the College's website.* For the purposes of this class, academic dishonesty includes (but is not limited to):

- “Unauthorized collaboration or use of external information during examinations.” This includes the pre-lab quizzes.
- “Plagiarizing or otherwise representing another's ideas as one's own.” This includes copying or paraphrasing portions of your lab report (including the introduction) from the lab manual, handouts, ‘old files’, your lab partner, Google, etc.
- “Falsely obtaining, distributing, using or receiving test materials.”
- “Soliciting or offering unauthorized academic information or materials.”
- “Falsifying experimental data or appropriating the experimental data of another without explicit permission of the instructor”, i.e., ‘dry-labbing’

- “Engaging in any other conduct that is intended or reasonably likely to confer upon one's self *or another* unfair advantage or benefit respecting an academic manner.” This could include providing your lab report to someone else to copy, for example. *You are responsible for what happens to your work.*

While you are welcome—and encouraged—to discuss conclusions, calculations, etc. with each other, the TAs and the instructor, **you must put it all in your own words, and do so based on the work that you did in the lab.** If you are uncertain about whether something is permissible, please ask!

Any incident involving academic dishonesty may result in a zero for the activity (lab report, quiz, etc.), a full letter-grade reduction in your final course grade (e.g., a B+ may be lowered to a C+), and a detailed account of the incident being made to the Dean of the College of Arts and Sciences. *A zero received for academic dishonesty will not be dropped in the calculation of your final grade.*

Safety: You will be given safety instructions specific to each lab during the pre-lab session. General rules and precautions for *all* experiments are included on pp. vi and vii of your lab manual. Those pages document policies of this class, and are to be considered a part of this syllabus. ***Failure to follow these rules, or behaving in a manner that jeopardizes your safety or the safety of others, may result in immediate dismissal from the laboratory, and forfeiture of all points associated with that experiment.***

Lab Notebook and Recommendation Letters: If you anticipate asking me to write a letter of recommendation for you in the future (for a summer program, Pharmacy school, etc.), then you should keep your lab notebook and/or graded work past the end of the semester—I will not agree to write a letter without it! Conversely, providing it will potentially allow me to include the kind of specifics that make for a strong, convincing letter.

A Final Note: What you take away from this class, both in terms of learning and your grade, is up to you. The best advice I can provide you is to take advantage of all the resources available—ask questions in lab, while material is still fresh in your mind, come to office hours, visit the tutors, work in groups, etc. Learning chemistry is not always an easy road, but it is a rewarding one. No matter your major, the skills you develop

*<http://catalog.creighton.edu/undergraduate/academic-policies-procedures/academic-honesty/>

in making observations, thinking critically, and drawing conclusions will be of benefit to you.

Electronic Devices: During the quiz, absolutely no electronic devices (except a non-programmable calculator) are allowed. If you are *seen* with one during the quiz, you will get a zero for that quiz. During the lab, you may use electronic devices (laptops, smartphones,

etc.) for lab-related activities, but not for other things. If you're texting during lab, we'll ask you to put it away.

Special Thanks: To Dr. Jess Gunn for writing the syllabus that this irreformable *theoretical* chemist has shamefully (but with permission) copied nearly verbatim.

Calendar of Experiments and Quizzes:

Date	Quiz	Experiment	Short Title
24 Jan	–	1	Molar Mass of a Gas
31 Jan	1	2	Spectroscopy
7 Feb	2	3	Kinetics
14 Feb	3	4	Equilibrium
21 Feb	4	5	K_{sp} for $\text{Ca}(\text{OH})_2$
28 Feb	5	6	K_a and pK_a
7 Mar	6	7	Polyprotic Acids
14 Mar	–	–	Spring Break – no lab
21 Mar	7	8	Buffers, Part I
28 Mar	8	9	Buffers, Part II
4 Apr	9	10	Thermodynamics
11 Apr	10	11	Electrochemistry
18 Apr	–	–	Holy Thursday – no lab
25 Apr	11	12	Reduction Potentials
2 May	12	–	Dead week: Final Quiz