

Syllabus for CHM 342: Physical Chemistry Laboratory

Laboratory: RGSB 217 | Recitation: Friday • EPLY 107 • 2:00–3:15 PM • Spring 2019

<http://freitag.creighton.edu/CHM342>

Laboratory Director: Dr. Bradley Parsons bparsons@creighton.edu office: HLSB 264	Section AA: Tuesday, 8:00–10:45 AM Section CC: Thursday, 8:00–10:45 AM Office Hours: MW, 11:00 AM–2:00 PM; F, 11:00 AM–1:00 PM
Section Instructor: Dr. Mark Freitag freitag@creighton.edu office: HLSB 263	Section BB: Tuesday, 11:00 AM–1:45 PM Office Hours: see http://freitag.creighton.edu

Required Materials.

1. Physical Chemistry Laboratory Manual
2. Scientific calculator
(non-graphing and non-programmable)
3. Laboratory notebook
(available from the stockroom, RGSB 121)

Course Objectives.

1. Learn how to properly fit a data set (including proper significant figures and units).
2. Interpret a data set consistent with a molecular view of chemistry.
3. Learn to present scientific ideas in a language and format appropriate for publication in a peer reviewed journal of physical chemistry.
4. Develop an understanding of experimental physical chemistry techniques.
5. Develop an ethic of laboratory safety.

Late Policy for Attendance. This is a required course for all chemistry majors. Attendance at all the recitation and laboratory sections is expected. A TA will take attendance at the beginning of the recitation; if you are more than five minutes late (according to the wall clock), two points will be deducted from your recitation attendance grade. In a similar fashion, attendance will be taken at the beginning of the lab. If you are more than five minutes late for the lab then you will automatically receive a zero for all assignments based on that lab exercise. For experiments that require more than one week, missing any of the lab days will result in an automatic zero for the entire experiment.

Late Policy for Assignments. Some assignments will be due at the **beginning** of recitation or lab. Recitation will begin promptly at 2:00 PM according to the clock in the room and labs begin promptly according the lab wall clock. If you are late for recitation (i.e., arrive at

2:01 PM or later), then we ask that you take a seat in the back of the classroom. Any assignment due that week will be marked late and points will be deducted according to the late policy (see below). If you know there is a good possibility that you may be late, then please make arrangements with the instructor before class and plan to turn in the assignments early—you can always put the assignment under the instructor's door the previous evening.

For any assignment submitted after the deadline, 10% will be deducted from the raw score for that assignment. Another 10% will be deducted for each consecutive day (i.e., 24 hour period) until the assignment is received. If you must submit a late assignment over the weekend, please make prior arrangements with your instructor, which may include submitting the assignment electronically.

Submitting Assignments. When requested raw data (i.e., spectra or tables of measurements) must be submitted electronically to your section instructor, use the email addresses given above. On the other hand, unless otherwise arranged, electronic submissions for reports will not be accepted.

Print anything you turn in double-sided to save paper. If you email your paper to the instructor for him to print out, you will be assessed a 10% point penalty.

Lab Manuals and Notebooks. Lab manuals are *not* permitted in the laboratory except during data fitting weeks. If you are unprepared and must bring the manual into lab, then there will be a 10% penalty to the raw score for that particular lab exercise, i.e., for a 30 point exercise you will lose three points before the exercise is graded. All students are expected to have their notebooks for each lab. **You will use a pen whenever writing in your lab notebook.**

Excused Absences. We recognize that you occasionally have responsibilities outside of class. Therefore, excused absences will be granted under the following conditions:

- A university sanctioned event. (e.g., an athletic competition)
- A personal or family illness. (physician's note required)
- A preplanned family event (e.g., wedding, etc.).

In any of these situations, documentation before granting an excused absence is required, and a makeup time for the laboratory exercise will have to be set.

Class Cancellation. In the event that classes are canceled due to weather (e.g., snow) or any other reason (e.g., nuclear holocaust), then the laboratory schedule will be revised to account for the missed material. If classes are cancelled then I shall notify the class via your university email address and make arrangements to makeup the lab or recitation material that is missed.

Laboratory Safety. *Students are expected to wear safety glasses or goggles during all laboratory exercises.* Gloves should be worn when needed, such as when working with chemicals. At no time are students permitted to wear shorts, short skirts, or any open toed footwear (e.g., sandals) in the laboratory. Any student coming into the laboratory wearing inappropriate dress will not be permitted to participate in the activities and will receive a zero for that particular assignment.

Other general safety guidelines.

1. Students may not work in the laboratory unattended. If make-up work is to be done, it must be carried out under supervision of either the laboratory instructor or a TA.
2. Eating or drinking in the laboratory is forbidden at all times.
3. Never return unused chemicals to the bottles. Always return chemical bottles to their proper place so that others can use them.
4. Dispose of chemical waste in the appropriately labeled container and never in the sink drain.

Lab Behavior. We expect everyone in this class to act like an adult during the lab. Furthermore, as has been discussed above, a primary goal of this class is to develop and instill a ethic of lab safety. As such, we will deduct points from lab grades for unacceptable behavior. Such behavior includes but is not limited to:

1. Showing up late for lab or leaving the lab without the consent of the instructor.

2. Playing with equipment not related to the current experiment.
3. Talking on your phone, sending text messages, etc.
4. Generally goofing off or disrupting the class.

We will deduct points from any student that demonstrates unacceptable behavior during recitation or lab. The point deduction is from the raw score before grading the lab; e.g., if 10% is deducted from a report that is worth 30 points then three points are deducted before the lab is graded. The deduction scale is as follows:

- 1st offense: -10% from the raw lab score
- 2nd offense: -25% from the raw lab score
- 3rd offense: expulsion from lab with a 0 lab score

These rules are cumulative over the semester. If there are behavioral problems during a lab that is counted as a first offense, then behavior problems in any subsequent labs count as 2nd and 3rd offenses.

Electronic Devices. Devices such as iPads or cell phones are not permitted. Instructor consent is required if you want to use a laptop computer in the laboratory during writing periods. If you are seen with a cell phone or similar mobile device then you will be warned the first time; however, you will receive only one warning during the semester. If you continue to use your cell phone or other electronic device during class then we reserve the right to remove you from the class for that day and you will forfeit all points for all assignments based on that lab. These rules also apply for visits during office hours.

Lab Manuals. You should always come to lab with your notebook prepared with all the necessary information to complete the experiment. The lab manual is not allowed in the lab (indeed, you should not have any book other than your lab notebook in the lab). We keep a record of the total number of times that each student brings the lab manual into the lab and for each infraction we deduct 10 points from your raw lab grade.

Course Grades. This course is graded out of 440 points. Letter grades are assigned according to the following scale:

A	B+	B	C+	C	D
93%	88%	82%	78%	70%	60%

Course Assignments.

- 1. Lab Quizzes (4 points each):** At the start of most labs there will be a short quiz covering important material related to that lab. These quizzes will generally involve a simple calculation and will last for about five minutes. Note that if you are late to lab then you will not be given extra time for the quiz, so we encourage everyone to be on time according to the wall clock.
- 2. Formal Paper (180 points):** You will write one formal paper for this course. This paper must be written as an individual exercise in a style acceptable for submission to the *Journal of Physical Chemistry A*. See pp. 4–9 in the lab manual for much more about the expectations for the formal paper.

As a general rule, you should plan to finish your paper at least two days before the draft is due. Then you can do a final revision the morning before the paper is due. A paper that is finished at the last minute generally does not receive as good of a score compared to those papers that are completed well in advance.

- 3. Attendance and Lab Notebook (30 points):** The lab notebook has a very general purpose in this course. Whenever you are working on something related to this course, either in the laboratory or at home, you must be writing in your notebook. The notebook is for more than just observations; calculations and notes from reading literature papers belong in the notebook as well! Thus, you will write in your notebook at all times when you are working on this course. If at any time (other than in recitation) we see a student writing material related to the course outside of the lab notebook then we will deduct five points from this grade.

Note that if a student is consistently tardy and turns in a poor quality notebook then it is entirely possible to receive negative points for this portion of the course grade.

- 4. Lab Reports (30 points each):** Each lab has a lab report associated with it. These reports must be completed individually. Each instructor will have different expectations for their lab reports; see your individual section instructor for details.
- 5. Literature Summary (30 points):** You will write a short summary (2–3 pages, typed double spaced) of an article from the literature. This literature review is to be completed as a lab group exercise.

Requests to Proofread Papers. If you wish to have an instructor look over or proofread a paper before it is turned in then you should discuss this with the faculty member. However, it must be noted that proofreading does incur a grade penalty as follows:

Help constructing an outline:	Free (no grade penalty)
Minor proofreading (reading one or two paragraphs)	5% deduction from raw score
Significant proofreading (reading or correcting a section)	10% deduction from raw score
Major proofreading and editing (more than one section)	50% deduction from raw score

Academic Honesty. We expect that you, as Creighton students and junior chemistry majors, will treat this course, the faculty, and your fellow students with the respect that is deserved and that you will behave with integrity in all aspects of your studies. However, in the unlikely event that one of you does not, the College of Arts and Sciences has an established policy on academic dishonesty that you should be aware of.*

Evidence of cheating in this course (e.g., copying someone else's lab work without assigning credit) will result in a zero for both students for the particular assignment. If the assignment was a group assignment, then all members of both lab groups shall receive a zero for the entire assignment. In addition, it will be necessary to inform the Dean's office of the infraction. Under some circumstances, this can result in a note attached to the permanent academic transcript.

You may work together if you wish. For some people, these group discussions are a critical part of the learning process; others prefer to work alone. If you work with others, be careful: in the group setting, you can help each other understand the problem and its solution, but we don't want to see identical work. Once you understand the problem and the basic technique required to solve it, work out the details on your own. We won't grade identical or nearly identical work.

Finally, we urge everyone to avoid any temptation to 'borrow' written material from classmates. *It is incredibly easy to spot text that is shared between two students*, and it is better to turn in a late assignment rather than risk losing all points on the assignment and something appearing on your permanent academic record.

*See <http://puffin.creighton.edu/ccas/policies/acadhonesty.html>

Point Distribution.

Lab Reports (6 total, 30 points each)	180 points
Formal Paper Rough Draft (10–12 pages plus figures, tables, etc)	100 points
Formal Paper Final Draft (10-12 pages plus figures, tables, etc)	80 points
Literature Summary (2–3 pages)	30 points
Attendance and Lab Notebook	30 points
Quizzes (best 5 kept, 4 points each)	20 points
Total:	440 points

Lab Schedule.

Date	Week	Team A	Team B	Team C	Team D	Quiz	Other Items This Week (all items due on Friday at 2 PM)
15 Jan	1	No Lab					Recitation on Friday
22 Jan	2	University Closed: No Lab					
29 Jan	3	Expt. 2	Expt. 3	Expt. 2	Expt. 3	1	
5 Feb	4	Expt. 3	Expt. 2	Expt. 3	Expt. 2	2	
12 Feb	5	Data Fitting					Literature Summary
19 Feb	6	Experiment 1					Expt. 2 and Expt. 3 Reports
26 Feb	7	Data Fitting				3	Experiment 1 Report
5 Mar	8	Experiment 4				4	Formal Paper Rough Draft
12 Mar		Spring Break					
19 Mar	9	Data Fitting					Experiment 4 Report
26 Mar	10	Expt. 5	Paper	Expt. 5	Paper	5	
2 Apr	11	Data Fit	Expt. 5	Data Fit	Expt. 5	5'	
9 Apr	12	Data Fitting					Experiment 5 Report
16 Apr	13	Experiment 6				6	
23 Apr	14	Data Fitting					Experiment 6 Report
30 Apr	15	Formal Paper					Formal Paper Final Draft Lab Notebook
7 May	16	Finals Week					

Experiment	Title
1	Absorption Spectrum of a Conjugated Dye
2	Heat of Combustion
3	Solution Calorimetry
4	The Effect of Ionic Strength on the Rate Constant
5	Quantum Confinement: CdSe Nanocrystals
6	Infrared Spectroscopy of HCl and DCl