

CHMY 374: Advanced Physical Chemistry Laboratory Spring 2019
Syllabus and Course Policies-CORRECTED 27feb19
Spring Break is Mar 18-22 (not Mar 11-15)
also: Maybe no lab on Mar 7

Web Page <http://www.chemistry.montana.edu/callis/courses/chmy374.html>

Meeting Place: 343 Gaines Hall
Meeting Time: Thursday, 12:15 pm -3 pm

Instructor: **Prof. Pat Callis**
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SEMESTER SCHEDULE (as of 10jan19; subject to change by Professor)

NOTE: Starting last year there is a “Final Exam”; See below.

Week	Date	Experiment
1	Jan. 10	Orientation; Absorbance fundamentals
2	Jan. 17	Electronic spectra of I ₂ vapor: Franck-Condon Factors Exp. 1:
3	Jan. 24	Electronic Structure and Solvent Effects: Pyrazine
4	Jan. 31	Discussion of Exp. 2; Exp. 3: Fluorescence Spectroscopy I
5	Feb. 7	Fluorescence Spectroscopy I (continued)
6	Feb. 14	IR Spectroscopy II: Vibrations of Polyatomic Molecules
7	Feb. 21	Iodine Vapor Pressure I: Experiment and $\Delta H_{\text{sublimation}}$
8	Feb. 28	Calorimetry: Heat of Combustion: Benzoic acid and naphthalene
9	Mar. 7	Finish Calorimetry (if necessary)
10	Mar. 14	Iodine Vapor Pressure II: Statistical Mechanics
11	Mar. 21	***Spring Break*****
12	Mar. 28	Fluorescence Spectroscopy II: Nanosecond Fluorescence Decay
13	Apr. 4	Fluorescence Spectroscopy II: Nanosecond Fluorescence Decay
14	Apr. 11	Kinetics of a Cis-Trans Isomerization Using NMR
15	Apr. 18	Computation of Electronic and Molecular Structure

16 Apr. 25 Makeup/help session
 17 **Thur., May 2** **Final Exam 12-1:50 pm** (or other time by mutual agreement)
 This “**Final Exam**” is to comply with the University mandate that Department will have a means for long-term tracking of student performance. It will be an ACS Comprehensive Physical Chemistry Exam and **is worth 100% of a lab report, no matter what your score.** T

Course Sequence for classes whose first class day of the week is T or R.

Regular Course		Final Exam	
Start Time		Period/Date	
8:00 - 8:59 a.m.	12-1:50pm	.....	Apr 30
9:00 - 9:59 a.m.	4-5:50pm	.....	May 01
10:00 - 10:59 a.m.	2-3:50pm	.....	May 03
11:00 - 11:59 a.m.	12-1:50pm	.....	Apr 29
12:00 - 12:59 p.m.	12-1:50pm	.....	May 02
1:00 - 1:59 p.m.	12-1:50pm	.....	May 03
2:00 - 2:59 p.m.	12-1:50pm	.....	May 01
3:00 -3:59 p.m.	2-3:50pm	.....	Apr 30
4:00 - 4:59 p.m.	2-3:50pm	.....	Apr 29

* See below for 5:00 p.m. or later

Course Policies

Safety

- 1) **Safety glasses are to be worn at all times** whenever experiments are being conducted by anyone in the laboratory. Some experiments involve slightly corrosive chemicals and/or evacuated containers, which pose a possible hazard to all in the lab.
- 2) For the same reasons, **shorts and open toed shoes are not to be worn in the lab.**
- 3) Bring **no food or drink into the lab.**
- 4)*** **Do not use or add to any substance in an unlabeled bottle. Dispose waste chemicals ONLY in bottles SPECIFICALLY LABELED for the type of chemical to be disposed. Check with your TA or instructor before the first use of the disposal bottle.**
- 5) It is the *policy* of this course that containers of **strongly oxidizing solutions will NEVER be present in the lab. (If you notice such solutions in the lab, tell the instructor)**
 Concentrated strong acid containers will be kept in the appropriate storage cabinet except when preparing solutions. They should **never** be out of the cabinet at times when students are disposing of organic waste. **(Fatal accidents have happened from accidentally adding organic waste to certain strong acids. (sulfuric, perchloric, nitric especially)**

Grading

- ✓ 100 percent of the final grade will be based on 10 or 11 lab reports weighted according to effort required.
- ✓ A total score of 90 % or greater will definitely deserve an “A” grade. The assignment of final grades will, however, be curved, so the familiar 90-80-70-60 grading scale should not be assumed.
- ✓ Lab reports are graded on an absolute standard of accurate data, a demonstrated understanding of the relevant chemical principles, and the clarity and completeness of presentation.
- ✓ Lab reports may be handed to the TA, or placed in folder on the TA’s office door.
- ✓ Every effort will be made to be consistent in grading throughout the semester.

• **Deadlines**

Lab reports are usually due at the start of the following lab period, one week after lab is done. For some labs, two weeks will be allowed. There will be a penalty for late lab reports. The normal penalty will be 5 percentage points per weekday late, up to a maximum of 50 percent. Requests for deviation from this penalty must be discussed with the TA or instructor. Favorable consideration is more likely to be given when notification is significantly prior to the due date. Instructor and TA reserve the right to escalate penalties if excessive tardiness becomes endemic. It is important for all concerned not to fall behind by multiple reports; they are very time-consuming. It is difficult for lab reports to be graded fairly and consistently unless they are all graded at approximately the same time.

• **Makeup labs**

Makeup labs are permitted under certain circumstances and shall be arranged with the TA and professor. Favorable consideration is more likely to be given when notification is significantly prior to the scheduled lab period.

• **Absences**

If a lab partner is absent, the individual present will do the experiment on his/her own. The absent partner will do the experiment in a makeup session (if approved by the instructor).

• **Lab Notebook**

Each student will keep a bound, page-numbered lab notebook--*written in pen only*. Mistakes should be crossed out, not be erased, and pages should never be torn out. Order and neatness are not as important as authenticity of the record. This is standard practice in industrial and government labs and in graduate programs.

Lab procedures and the flow of events during each experiment shall be recorded in the notebook. Where applicable, raw data shall be logged in the lab notebook. Much raw data will, however, be collected and stored on disk. That is considered primary data and should not be deleted until *final* grades are assigned. Excerpts of the data may be printed and taped into your notebook, when you feel it is appropriate. Either the notebook or a copy of the relevant pages shall be turned in with the lab report. Notebooks must be signed by the TA or professor at the end of each lab experiment.

- **Lab Reports**

- ✓ Lab reports must be typed.
- ✓ Data collected jointly by lab partners may be shared between the partners, **but each individual is responsible for preparing his/her own lab report.** Discussions among fellow students to enhance understanding are encouraged; however, group lab reports are not acceptable. Obvious copying or plagiarism will be given zero credit.
- ✓ General outline of lab reports:
 - 1) Introduction – precise subject, scope, purpose/objectives
 - 2) Experimental – description of what was done, equipment used, type of data collected
 - 3) Results: Raw data tables and plots; description of analysis done and presentation of reduced data (when appropriate). **Be specific about what calculations were done**
 - 4) Discussion – significance of results, comparison with other's results or with literature, comments on accuracy and/or precision of results, enough discussion/analysis to show understanding of results and of most significant error(s) in experiment.
 - 5) Conclusions – convictions based on evidence provided by data and analysis, linked with objectives of experiment. The conclusion will be evaluated seriously and should show that the student understood the key concepts of the lab experiment. Merely restating the results of calculations is not enough. Students should avoid fluffy comments, such as: "I liked this lab. Everything worked fine. I learned that accurate data can be obtained when one is careful. The experimental procedure yielded fairly accurate results with high precision."

Conditional

- 6) Any specific directions given in the lab handout for that experiment
- 7) References – attach literature citations if applicable
- 8) Tables – attach tables if applicable
- 9) Graphs – attach graphs if applicable
- 10) Lab notes –copies of lab notebook pages containing record of experiment done for this report
- 11) Appendix – often unnecessary – supplementary material needed for completeness, but which would detract from orderly and logical presentation if

inserted into report. e.g., derivation of equations, detailed description of physical principles, descriptions of failed runs