

Chemistry 564

Objectives

- Understand the fundamentals of spectroscopic techniques
- Understand the basics of instrumentation in relation to making an experimental measurement
- Emulate, to some extent, the process by which new knowledge is generated
- Generate technical reports in a style that emulates scholarly publications
- Communicate scientific content in oral conversation
- Make connections between quantum mechanics and qualitative physical descriptions

Safety

Eye protection (goggles, or safety glasses that include side protection) and closed-toe shoes are always required in the laboratory whenever any experiments are in progress. Specific safety concerns are addressed in the individual experiment handouts.

Graded Materials

- *Online quizzes:* Each project lab has four quizzes on the Learn@UW course website worth 15 points each. You have an unlimited number of attempts at each quiz and your final score will be the highest score of all attempts. Make sure to make some attempts early enough that you can get help from a staff member, if needed.
- *Oral exams:* You will perform an oral exam worth 50 points for each of the project labs.
- *Written Reports:* Each project lab requires a written report which is worth 50 points. The report (and relevant spreadsheets) should be submitted electronically on the Learn@UW course website.
- *Evaluation Scores:* A 10 point evaluation score will be assigned each day based on performance, participation, and overall lab hygiene.

Grading

| | |
|------------------------|-----------|
| Evaluation Scores (10) | = 100 pts |
| Quizzes (8) | = 120 pts |
| Written Reports (2) | = 100 pts |
| Oral Exams (2) | = 100 pts |

Total = 420 pts

The written report and oral exams are graded using the following guidelines:

- The overall strategy is to first assign an overall letter grade, then assign a score in the range based on the presence of minor flaws such as grammar and spelling mistakes, and lastly deduct points for late penalties or for improper presentation of data (e.g. plots with inappropriate formatting, tables that lack units or uncertainty estimates, etc). The grade categories, and corresponding points on a 50-point scale, should be viewed as:
 - *A*, 42-50: A letter grade of *A* means that the student: understands the concepts behind the experiment, understands the experimental implementation, understands the experimental variables, understands how to properly assign and propagate experimental uncertainty throughout the experiment, and has acquired data of reasonable quality (1-2 outliers, expected trends are present, etc).
 - *AB*, 38-42: A letter grade of *AB* means that the student demonstrates flaws in a few minor aspects of the above mentioned characteristics. Common situations include assigning uncertainty without proper justification, performing calculations without subsequent discussion in the text, excessive outliers in the data set, etc.
 - *B*, 32-38: A letter grade of *B* means that the student demonstrates a major flaw in understanding in one or two of the above mentioned characteristics. Common situations include improper assignment of uncertainty, mistakes in calculations, incorrect statements regarding the concepts behind the experiment, etc.
 - *BC*, 28-32: Compared to the previous case, a letter grade of *BC* means the student demonstrates multiple major flaws in scientific reasoning and the data analysis, but calculations are still expected to be mostly correct.
 - *C*, 20-28: The concept of a letter grade of *C* is that the student has, in a certain sense, simply followed directions and has completed what has been asked of them without scientific thought. The report must still be complete, and include all items discussed in the “Postlab Checklist” present at the end of each experiment handout. Calculations must also be mostly correct. Essentially this means a report basically just presents the data, calculations, and results without a directly relevant, meaningful discussion (assignment of uncertainty may not be discussed at all, improperly assigned, etc.)
 - *D*, 10-20: A letter grade of *D* means that the report is inappropriate in some fashion, such as completely missing a necessary section or lacking items discussed in the “Postlab Checklist” present at the end of each experiment handout.
 - *F*, 0-10: A letter grade of *F* means the student has failed the report. Compared to the previous case this means the report is simply missing multiple, necessary items.
- Written report and oral exam scores will be normalized across all graders at the end of the semester.

Using the above guidelines for the report and oral exams, and assuming perfect scores for quizzes and the evaluation scores, final grades are intended to be assigned on the following scale:

| | |
|-----------|--------|
| <i>A</i> | >93% |
| <i>AB</i> | 90-93% |
| <i>B</i> | 83-90% |
| <i>BC</i> | 80-83% |
| <i>C</i> | 73-80% |
| <i>D</i> | 63-73% |
| <i>F</i> | <63% |

Schedule (★ = online individual submission, ☆ = hard copy group submission)

| Week | Activity | Notes |
|-------|-----------|--|
| 9/12 | Microwave | ★ Day 1 quiz due start of lab |
| 9/19 | Microwave | ★ Day 2 quiz due start of lab |
| 9/26 | Microwave | ★ Day 3 quiz due start of lab |
| 10/3 | Microwave | ★ Day 4 quiz due start of lab |
| 10/10 | Microwave | |
| 10/17 | Microwave | ★ Report and spreadsheet due start of lab ☆ Oral exam |
| 10/24 | NMR | ★ Day 1 quiz due start of lab |
| 10/31 | NMR | ★ Day 2 quiz due start of lab |
| 11/7 | NMR | ★ Day 3 quiz due start of lab |
| 11/14 | NMR | ★ Day 4 quiz due start of lab |
| 11/21 | | <i>Thanksgiving Break</i> |
| 11/28 | NMR | |
| 12/5 | NMR | ★ Report due start of lab ☆ Oral exam |

Note that although this course is only one credit, it is a 500-level course. The work in this course can be very difficult and time-consuming. The key to minimizing the overall time you spend on this course is to do as much work as you can in the lab when there are other students and staff around to provide assistance.

Academic Misconduct

Make sure you are aware of the rules regarding academic misconduct. An overview of the rules can be found at <http://students.wisc.edu/doso/acadintegrity.html>. Pay particular attention to the following sections:

Collaboration or Group Assignments

You should be aware that different instructors have different expectations about working with others. If you wish to consult with or work with another student on an assignment and you are not sure of the course rules, ask the instructor. It is each student's responsibility to seek information about the boundaries of appropriately working with others on assignments, papers, experiments, or examinations. If no rules concerning working with others have been discussed in a course, the student must assume that working with others writing a paper, completing homework, or taking an exam is not permitted.

Plagiarism

Plagiarism means presenting the words or ideas of others without giving credit. You should know the principles of plagiarism and the correct rules for citing sources. In general, if your paper implies that you are the originator of words or ideas, they must in fact be your own.

If you use someone else's exact words, they should be enclosed in quotation marks with the exact source listed. You may put someone else's idea in your own words as long as you indicate whose idea it was (for example, "As Jane Smith points out, . . ."). If you are unsure about the proper ways to give credit to sources, ask your instructor or consult the Writing Center at 6171 Helen C. White Hall (phone: 608/263-1992, e-mail: writing@wisc.edu) for a copy of their handout "Acknowledging, Paraphrasing, and Quoting Sources," which you can download [here](#).

Guidelines for Academic Misconduct in the Physical Chemistry Laboratory

All writing presented in your formal reports must constitute your own intellectual property. Although you may certainly discuss ideas with other students, the presentation of those ideas must be your own individual work.

What *is* allowed:

- Work with other students for all experimental work
- Collaborate with other students for all data analysis work, including preparation of plots and tables
- Discuss ideas with other students regarding the interpretation of experimental results

What *is not* allowed:

- Write a report based off someone else's work (another student, or a literature paper)
- Collaborate with other students on the written discussion of results, ideas, and concepts related to the experiment (i.e. write a group report)
- Submit a report with portions of text that are identical to the work of another person
- Submit a report where the presentation of ideas is identical to the work of another person (text only differs by superficial paraphrasing)

Cases of academic misconduct in the physical chemistry laboratory generally result in a score of 0 for the report for all individuals involved. A report of the incident is also filed with the Offices of the Dean of Students.

With this in mind, do not share electronic versions of your lab report with other students. You are certainly welcome (and encouraged) to receive feedback from students and staff on rough drafts of your report, but be protective of your intellectual property.