

Syllabus

CHEMISTRY 218

Sections 205(CRN 2970), 206 (CRN 2969)

Instructor: Phil Alexander

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Room: 473 and 474/476

Office hours: 10-11 and 12-1 M, W, F or by appointment

Prerequisite or Corequisite: CHM 212

Phone: 304-696-4808(Office)

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Class time: 8:00-10:45R

Purpose of Course:

1. To introduce you to the basic laboratory skills of careful measurements and handling of experimental data.
2. To provide laboratory experience which emphasizes and reinforces the principles and concepts of chemistry introduced in your CHM 211 and 212 courses.
3. To acquaint you with the quantitative thinking and procedures encountered in elementary physical chemistry, analytical chemistry, and biochemistry with emphasis on the interplay between theory and experiment.

Materials Needed:

1. CHM 218 laboratory manual available at MU Bookstore. (New edition this semester.)
2. A bound (sewn, not a spiral bound or taped notebook) laboratory notebook. All experimental data must be recorded directly in this notebook during your laboratory period. You may use a notebook used in 217 if the book has sufficient space.
3. Safety glasses/goggles. Full-coverage glasses/goggles are required. Contact lenses should not be worn in the chemistry laboratory. If contacts are absolutely necessary, a good set of safety goggles must be worn at all times while in the laboratory. If you wear contact lenses, you must notify your instructor and teaching assistants.
4. A combination lock for your lab drawer.
5. An apron, or other covering for your clothes, is optional, but desirable.
6. A roll of paper towels for cleanup, spills, etc.
7. Access to a textbook to read about the concepts for the experiments to be completed.
8. A scientific calculator. Those with alphanumeric and/or graphing capabilities are **not permitted** during quizzes or exams.
9. The ACS academic lab safety guide is needed. This is available to download at http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/publications/WPCP_012294

Conduct of Course:

1. Attendance is required in this course and tardiness will not be tolerated. Turning in labs not performed will result in a score of zero for that lab and may result in failing the course.
2. The first half hour to hour of each period will be spent in a discussion of the experiment to be done in that period and the chemical principles related to it.
3. Quizzes of 10-15 minutes duration will be given weekly. A quiz may cover any previous experiments as well as the experiment of the day.
4. The bound notebook is for the immediate recording of all experimental operations and observations made during the laboratory period and will be checked throughout the term. All calculations, pre-lab notes, post-lab questions, etc. should be in this notebook. The notebook is your workbook. Please write in ink.

5. Lab reports are due at the beginning of the period following completion of the experiment. Late reports will be assessed a penalty of 10% of the grade per day.
6. The effects on human gestation of all of the chemicals used in the laboratory have not been determined. It may be advisable for pregnant students to avoid prenatal exposure by postponing this laboratory to a later date.
7. Plagiarism is a University offense. You must write your own report and not submit the same report as a partner.
8. Prelab questions are to be completed and turned in to the lab assistants for entrance to the laboratory.
9. Student must complete the departmental safety training and quiz before the second lab class and turn in the completed form(s) at that class.
10. Makeup lab work must be completed in the current week only. Ask permission.
11. When the experiment is completed and before leaving lab each day, students are to have the designated TA or instructor mark their notebooks.
12. Use care in following the directions of your instructor and laboratory text. Do not carry out any unauthorized experiments.

Important Dates:

Week of Jan 13 Lab class meets

Week of January 20 safety quiz and paper(s) completed

3/10 freshman midterm grades

3/28 last day to drop

3/15-22 spring break

Week of 4/28 lab final and checkout.

Mandatory Safety Training: Before the second class session, complete the Safety Training Course at MUonline. Students failing to complete this requirement (including submitting the signed form(s) which must be printed from page 1 of the training and getting 80% [12/15] on the quiz) will not be permitted to work in the lab.

Safety

1. Read the laboratory safety rules (pp v-viii) and chemical disposal rules (p xi) in the lab manual. There will be questions concerning this on quizzes and exams.
2. Read and sign one copy of the Chemistry Laboratory Questionnaire and keep a second copy (the one in your manual) for reference. The questionnaire must be signed before check-in is permitted.
3. You are required to comply with all safety rules and all safety-related instructions at all times. Failure to do so is grounds for dismissal from the laboratory.
4. Safety goggles must be worn at all times. Wearing of contact lenses in lab is strongly discouraged. If contact lenses must be worn, a Contact Lens Waiver Form (found in Safety training) must be signed and given to the instructor.
5. Slacks or dresses cut below the knee are required. Substantial shoes with low heels covering the entire foot must be worn. Avoid very loose clothing or unnecessary items of clothing. Jewelry should be removed.
6. Know the locations of all safety equipment in the lab. You will be tested on this. Complete the diagram (p vii) during first lab period.
7. All injuries, no matter how trivial, must be reported to the instructor immediately.

Note well: Observance of the safety rules (especially safety goggles) will be an important factor in determining the Instructor Evaluation portion of the laboratory grade. Any student violating safety rules may be dismissed from the lab.

All university policies, which can be found at this link http://www.marshall.edu/wpmu/academic-affairs/?page_id=802, will be observed.

Schedule of Experiments

| <u>Experiment/Assignment</u> | <u>Week of Performed</u> | <u>Week of Report Due</u> |
|-------------------------------------------------------------------------|--------------------------|---------------------------|
| Lab Check-In, Safety Information | Jan 16 | |
| #1-Introduction to Graphing | Jan 16 | Jan 23 |
| #3- Synthesis and Characterization of a Triboluminescent Compound | Jan 23 | Jan 30 |
| #4- Protein Extraction and Folding: Investigating Intermolecular Forces | Jan 30 | Feb 6 |
| #5- Kinetics of Decomposition of Hydrogen Peroxide | Feb 6 | Feb 13 |
| #6- Studying LeChâtelier's Principle | Feb 13 | Feb 20 |
| #7- Quantitative Analysis: How Accurate Can a Titration Get? | Feb 20 | Feb 27 |
| #9- Determination of Water Hardness | Feb 27 | Mar 6 |
| Mid-Term Exam | Mar 6 | |
| #12- Gibbs Free Energy: Solubility and Spontaneity | Mar 13 | Mar 27 |
| #10-pH Dependence of Drug Absorption | Mar 27 | Apr 3 |
| #11-Qualitative Analysis: What Metal Ions Are in This Solution? | Apr 3, 10 | Apr 17 |
| #13-Isolation of Copper Metal from Malachite Beads | Apr 3, 10 | Apr 17 |
| #2-Beer's Law: Determining Mass % of Acetylsalicylic Acid in Aspirin | Apr 17 | Apr 24 |
| #14-Synthesis of a Coordination Compound | Apr 24 | May 1 |
| Final Exam; Lab Check-Out | May 1 | |

Lab Report Format

Except where noted the lab report should be typed. Spelling and grammar should be checked. Parts must be in order.

1) In the upper right corner, enter your name, the date, and your lab partner

2) **Name and number of the experiment**

3) **Introduction-** one paragraph or so describing the experiment and its purpose. The procedure should not be copied here, but changes to the normal procedure should be noted.

4) **Data-** this should be the actual experimental data you obtained. Presenting it in tabular form is generally best. Observations are data and should be included in this section.

5) **Calculations-** one sample calculation should be provided for each calculation type you do. This can be hand-written, but must be neat. Be sure to label your calculations.

6) **Results and Discussion-** processed data (i.e. the results of your calculations), graphs, and meaningful explanations and analysis of your laboratory results should be provided here. Think about what your results mean as you write-up this section. What has this experiment shown you? If you discuss errors, don't just ascribe them to a generic "experimenter error" or calculation mistake. If something goes wrong, try to track down exactly what it was. If data is hard to determine or limited in some way, tell about that.

7) **Post-Lab Questions-** Answer these questions as full sentences, unless they are calculations (in which case they may be hand written and show your work) and number as in the manual.

Grading: The grade in this lab will be based on a wide variety of evaluation tools including exams, quizzes, laboratory experiment results and reports, homework assignments, notebooks, and evaluation by the instructor and /or teaching assistants. The weight for each component is as follows:

| | |
|---------------------------------------------------------------|-----|
| Quizzes (weekly, drop the lowest score) | 20% |
| Midterm exam (approx. 1 hour in length) | 20% |
| Final exam (approx. 1 hour in length) | 20% |
| Post-lab report and experimental results (Drop the lowest) | 25% |
| Instructor evaluation | 5% |
| Notebook | 5% |
| Pre-lab Questions | 5% |

The letter grades will then be assigned based on the average computed using the above weights. You may estimate your letter grade using the following table:

| | |
|-------------|---|
| 90 or above | A |
| 80 or above | B |
| 70 or above | C |
| 60 or above | D |
| 59 or below | F |

During quizzes or exams, talking and sharing of calculators is not allowed. Students will set in alternate rows while taking the quizzes. There are no make-up quizzes. Missed labs or quizzes count as your dropped grades.