

CHEMISTRY 110 LABORATORY SYLLABUS
Spring Term – 2019

Instructor:	David Saleeby
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Office Hours:	Monday: 8:30 AM – 9:30 AM 3:30 – 4:30 PM (HSC 353) Tuesday: 9:30 – 11:30 AM Wednesday: 8:30 AM – 9:30 AM 11:00 AM – 12:00 PM 1:00 – 3:00 PM

Meeting Time: Sec. 01: Wednesdays, 9:30 AM - 12:20 PM, Room 5402
Sec. 02: Tuesdays, 2:00 PM - 4:50 PM, Room 5402
Sec. 03: Mondays, 11:00 PM - 1:50 PM, Room 5402

Laboratory Manual: Experiments in Chemistry. Wentworth and Munk, 11th ed.
Cengage Learning. 2017. ISBN: 1-305-94498-4

Also Required: Laboratory Notebook and Safety Goggles

Laboratory Schedule (Tentative)	
Week	Expt. No. – Topic
January 14 – 18	Introductions Lab Syllabus Safety Discussion Lab Equipment Lab Notebook Discussion of Software for Writing Lab Reports
January 21 – 25	No Lab (Martin Luther King, Jr. Holiday)
January 28 – February 1	1A – Identification of an Unknown Compound
February 4 – 8	Introductory Lab (Handout)
February 11 – 15	3A – Empirical Formula of an Oxide
February 18 – 22	3B – Hydrates and Their Thermal Decomposition
February 25 – March 1	4C – The Acetic Acid Content of Vinegar
March 4 – 8	4B – Ionic Reactions in Aqueous Solution
March 11 – 15	No Lab (Spring Break)
March 18 – 22	6 – Thermochemistry
March 25 – 29	7 – UV/VIS Spectroscopy
April 1 – 5	Handout – A Study of Limiting/Excess Reagents: Synthesis of Lead (II) Iodide
April 8 – 12	5 – Decomposition of Potassium Chlorate
April 15 – 19	Review
April 22 – 26	Lab Exam
April 29 – May 3	No Lab

Laboratory Objectives:

The laboratory section of this course emphasizes the concepts introduced in the lecture portion of the course and is concerned with how facts are established. In the laboratory the student is expected to

1. Make complete observations and draw inferences from those observations.
2. Record complete and accurate descriptions of events in the laboratory.
3. Make accurate measurements using balances, volumetric equipment, and other instruments to the proper precision.
4. Demonstrate common laboratory skills and techniques for performing qualitative and quantitative chemical procedures.
5. Demonstrate communications skills for reporting laboratory results clearly, analytically, and knowledgeably.
6. Apply knowledge of chemical and physical properties of substances to experimental investigation.

Attendance:

Students are expected to attend and participate in all labs and to be on-time. To allow for illness or other unexpected emergency, school policy does allow a student to miss 10% of the hours a course meets. A student can miss one lab without make-up, provided the absences in the lecture portion of the course are not excessive. If a student misses a lab experiment, he or she will receive a zero, and if no other lab experiments are missed, the zero will be dropped. Students arriving to lab after an experiment has started will not be allowed to participate in that experiment and will receive a zero for the experiment, except in special or unusual circumstances.

The student is responsible for the material covered on all labs for the lab exam. If a student misses a lab exam due to an unavoidable emergency situation, it is the student's responsibility to contact the instructor within 24 hours of the originally-scheduled exam. If this is not done, the student will receive a zero. A doctor's excuse may be required if a student is out due to illness.

Students are required to bring their laboratory manuals and lab notebooks to all lab sessions. Students who fail to bring their lab manuals or notebooks to lab will not be allowed to participate in the assigned experiments(s) and will not be allowed to make-up the experiment(s). Preparation is the student's responsibility.

Special Assistance:

If you have a documented disability and require special assistance or accommodations to fully participate as a student, please contact the Office of Career Services and Counseling, Room 114 or 661-8029.

Special Instructions:

Students are required to read the assigned experiment in the lab manual prior to each lab session. This will enable students to work more efficiently, anticipate and resolve problems or questions which may arise in the course of an experiment, and improve their performance and understanding for the lab.

Students will perform the experiments individually on occasions, and there will be experiments when students work in pairs or groups.

Electronic Communication Devices in Classrooms/Laboratories:

To minimize classroom/laboratory disruptions and protect the integrity of lectures and test-taking, activated electronic communication devices such as pagers and cellular telephones are not permitted. All electronic communication devices must be silenced or turned off and put away upon entering the classroom.

If an electronic communication device is activated and rings during a lecture class, laboratory, or exam, the student/owner will be asked to leave the classroom and counted absent for that class period. If a student has an electronic communication device on their desk or table during an exam, he/she will receive a zero that that exam.

Special circumstances (such as on-call emergency personnel) are to be approved by the instructor prior to the class period.

Safety:

Safety is the first priority in the chemical laboratory. Each student should become thoroughly familiar with the safety features of the laboratory and study the safety and housekeeping rules at the beginning of the lab manual. It is the responsibility of each student to observe the safety precautions throughout the laboratory experiments and follow the procedures outlined in the manual. Students who fail to observe safety regulations or follow the procedures in the manual may be asked to leave the lab and/or may be penalized through point deductions on lab reports. Covered shoes must be worn in the lab. Sandals and open-toe shoes are not permitted.

Laboratory Notebooks: See handout: "Guide to Laboratory Notebooks"

Laboratory Reports:

Students will generally submit written laboratory reports for each experiment according to a prescribed format. The written reports must be computer-generated or typed on one side only of each page and either be stapled or presented in a binder. Due to time limitations towards the end of the course, you will use the report forms from your lab manual in lieu of written reports. Reports will be due as previously indicated in the laboratory schedule. Penalties will be assessed for late lab reports as follows:

- 1-2 Days overdue, -20%
- 3 Days overdue, reports not accepted

Laboratory Report Format:

All reports shall have the following format (unless otherwise specified).

TITLE PAGE

- Title of Experiment and Experiment Number
- Name
- Course Number
- Date report is submitted

I. Purpose and Introduction:

State the purpose of the experiment in one or two sentences, including the main method used to accomplish the purpose. Describe the theory or concept behind the method used.

II. Experimental Procedure:**(a) Reference**

Make a reference to the lab manual
(Title, author, publisher, edition or year, and page numbers.)

(b) Materials and Apparatus

A bulleted list of materials and apparatus should be included.

(c) Procedure Outline

A brief outline of the experimental procedure should be written in 3rd person past tense. Do not use personal pronouns, anywhere! Do not include results, data, or mathematical formulas in this section. Excessive detail should be avoided.

Correct: "20.0 mL of cyclohexane was pipetted into the freezing point apparatus."

Incorrect: "I pipetted 20.0 mL of cyclohexane into the freezing point apparatus."

Incorrect: "Pipet 20.0 mL of cyclohexane into the freezing point apparatus."

(d) Diagram of instrument or apparatus, where appropriate.**III. Results:**

(a) Data should be presented in table form. Each table should have a number and a title which reflects the contents of the table. Use appropriate column headings and properly label with units.

(b) Calculations for one set of data should be presented, step-by-step, to show how the final results are obtained. All values should be expressed with the proper units and to the proper number of significant figures.

All calculations should be identified. Calculations should not be wrapped from one line to the next. Use space between sample calculations.

Example of Proper:**Grams Mg(OH)₂ Product**

$$\begin{aligned}
 \text{Grams Mg(OH)}_2 &= \text{g MgO} \times \frac{1 \text{ mole MgO}}{\text{g. MgO}} \times \frac{1 \text{ mole Mg(OH)}_2}{1 \text{ mole MgO}} \times \frac{\text{g Mg(OH)}_2}{1 \text{ mole Mg(OH)}_2} \\
 &= 0.5010 \text{ g MgO} \times \frac{1 \text{ mole MgO}}{40.3 \text{ g. MgO}} \times \frac{1 \text{ mole Mg(OH)}_2}{1 \text{ mole MgO}} \times \frac{58.3 \text{ g Mg(OH)}_2}{1 \text{ mole Mg(OH)}_2} \\
 &= 0.725 \text{ g. Mg(OH)}_2
 \end{aligned}$$

Example of Improper:

$$\begin{aligned}
 \text{Grams Mg(OH)}_2 &= \text{g MgO} \times 1 \text{ mole MgO} / \text{g. MgO} \times 1 \text{ mole Mg(OH)}_2 / 1 \text{ mole MgO} \times \text{g} \\
 \text{Mg(OH)}_2 / 1 \text{ mole Mg(OH)}_2 &= 0.5010 \text{g MgO} \times 1 \text{ mole MgO} / 40.3 \text{g. MgO} \times 1 \text{ mole Mg(OH)}_2 / 1 \\
 \text{mole MgO} \times 58.3 \text{g Mg(OH)}_2 / 1 \text{ mole Mg(OH)}_2 &= 0.725 \text{g Mg(OH)}_2
 \end{aligned}$$

(c) All graphs should be numbered and have a title which reflects the variables in the graph.

IV. **Conclusion and Discussion of Results:**

Discussion of results should be half a page to a page (maximum). Stated conclusions should be supported by the numerical results obtained in the experiment.

The significance of experimental results should be related to concepts and principles covered in the course and tied to the purpose of the experiment. The instructor may assign questions or problems for particular experiments.

Grading:

The lab grade will be computed as:

Lab Reports:	50%
Lab Notebook	10%
Lab Exam	40%

Lab report scores will be determined by

- neatness, form, and presentation of the lab reports
- proper expression of observations and numerical values
- completeness of data and calculations
- accuracy of results
- answers to questions and problems

Point Breakdown: The following provides a rough indication of the point distribution for lab reports and will vary from experiment to experiment:

Housekeeping (includes neatness, form, proper numbering of lab report sections, numbering and title of data tables and graphs, title page). - 10 points

- I. Purpose/Introduction – 5-10 points
- II. Experimental Procedure – 10-15 points
- III. Results - 50-65 points
 - Data Tables
 - Calculations
 - Graphs
- IV. Discussion/Conclusion – 10-15 points