



Chemistry 102 – General Chemistry II - Laboratory

FALL 2016 – Revised 10/04/2016

Day/Time: MW 6:50 – 10:00 Section # 3067 Room CMS – 210



I am Professor

Maria Fenyes

Welcome to my class!

Laboratory Location: CMS, Room 210

Office Hours: M & W 10:00 P.M. - 10:35 P.M.

Location: CMS, Room 210

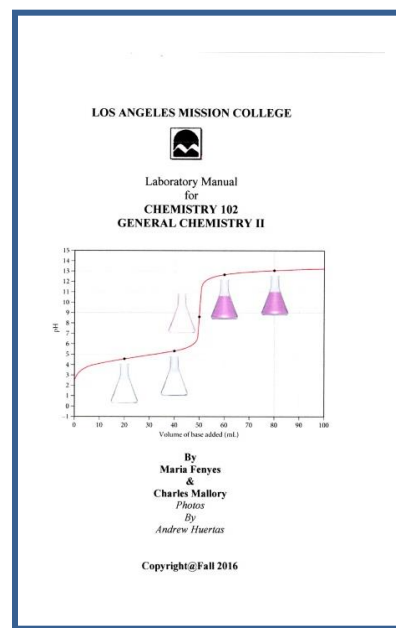
Email address: fenyesm@lamission.edu

Voice mail: (818) 364 -7600 x 4336

My website: www.proffenyes.com

This site has:

- 1. The Laboratory Manual, Fall 2016 Edition**
Prepared by Maria Fenyes & Charles Mallory
- 2. General Guidelines for Laboratory Procedures**
- 3. Sample Calculations and Sample Graphs**
- 4. Distribution of Laboratory Grades**
- 5. Posted grades throughout the semester.**
- 6. Announcements**



STUDENT LEARNING OUTCOMES

- 1. Describe, explain and model chemical and physical processes qualitatively at the molecular level in order to explain macroscopic properties.**
- 2. Solve quantitative chemistry problems through integration of multiple ideas and demonstrate reasoning clearly and completely.**
- 3. Perform laboratory techniques safely and accurately, analyze results of laboratory experiments, evaluate sources of errors, and use laboratory notebook to write formal laboratory reports, following standard scientific guidelines.**

REQUIRED MATERIALS

1. LABORATORY MANUAL

Required: “Laboratory Manual for CHEMISTRY 102 – GENERAL CHEMISTRY II” by Maria Fenyes & Charles Mallory, Fall 2016 edition.

Available at the C- Store (Convenience Store) in the CMS (Center for Math & Science) Building at Los Angeles Mission College Bookstore and also posted on www.proffenyes.com

You are required to have a print out (hard copy) of the experiment you will be performing for every laboratory session.

2. LABORATORY NOTEBOOK

Required: A quadrille paper, hard cover “Comp Book”, available in the LAMC Bookstore and in general office supply stores. You are required to have your laboratory notebook by the second class meeting. You are required to report all laboratory work in your Laboratory Notebook directly (no other sources). Please see instructions for proper usage of Laboratory Notebook on pages 8 & 9.

3. SAFETY GOGGLES

- You are required to wear safety goggles (Z87-appropriate for chemistry) at all times during laboratory work. Approved safety goggles are available in the L.A.M.C. Bookstore and any college or university Bookstore (Z87-appropriate for chemistry).
- You are required to purchase your own safety goggles and you may wish to keep them in your laboratory locker.
- Have your safety goggles by the 2nd class meeting (August 31th, 2016)

4. SCIENTIFIC CALCULATOR

Need not to be an expensive type, but it must perform the following operations: Addition, Subtraction, Multiplication, Division, Square Root, 1/x and log.

You are required to have your calculator with you for all laboratory sessions.

LABORATORY SCHEDULE – CHEM 102 – Fall 2016 - SECTION # 3067

Revised 08/29/2016

Week	Date	Exp . #	Activity	Notes
1	Aug. 29	---	Laboratory Procedures; Safety Discussions. Check – In.	---
	Aug. 31	1	The Rate Law	A
2	Sept. 5	---	LABOR DAY (College Closed)	A
	Sept. 7	1	The Rate Law	A
3	Sept. 12	1	The Rate Law (continued)	A
	Sept. 14	1	The Rate Law (continued)	A
4	Sept. 19	2	The Equilibrium Constant	A
	Sept. 21	3	Equilibrium Games	A
5	Sept. 26	4	The Effect of Concentration Changes on Equilibrium Systems	A
	Sept. 28	4	The Effect of Concentration Changes on Equilibrium Systems (cont'd)	
6	Oct. 3	---	No Lab – Instructor Absent	---
	Oct. 5	5	Acid and Base Strength	B
7	Oct. 10		First Lab Exam (You may consult your Laboratory Notebook)	
8	Oct. 12	6	A Study of an Acid Ionization Equilibrium	A
	Oct. 17	6	A Study of an Acid Ionization Equilibrium (cont'd)	A
9	Oct. 19	7	pH of Acid, Base and Salt Solutions (Part I)	A
	Oct. 24	7	pH of Acid, Base and Salt Solutions (Part II)	C
10	Oct. 26	8	Buffers	A
	Oct. 31	8	Buffers (calculations)	A
11	Nov. 2	9	Standardization of a NaOH solution with a Primary Standard	D
	Nov. 7	9	Standardization of a NaOH solution with a Primary Standard (cont'd)	D
12	Nov. 9	10	Evaluation of Data by the Standard Deviation Method	D
	Nov. 14	11	The Molar Mass of a Weak Diprotic Acid	C
13	Nov. 16	12	A Solubility Product Constant	A
	Nov. 21	13	Qualitative Analysis	C
14	Nov. 23	13	Qualitative Analysis	C
	Nov. 28	13	Qualitative Analysis	C
15	Nov.30	14	Determination of Iron by Permanganate Titration	C
	Dec. 5	---	Check Out & Review for Second Lab Exam	---
	Dec. 7	---	Second Lab Exam (You may consult your Laboratory Notebook)	---

CHEM 102 – Fall 2016
Distribution of Laboratory Grades

Experiment	Report Points	Unknown Points	NOTES
1. The Rate Law	40	----	A
2. The Equilibrium Constant	30	----	A
3. Equilibrium Games	20	----	A
4. The Effect of Concentration Changes on Equilibrium Systems	30	----	A
5. Acid and Base Strength	30	5	B
6. A Study of An Acid Ionization Equilibrium	30	----	A
7. pH of Various Solutions (PART I)	30	---	A
pH of Various Solutions (PART II)	----	15	C
8. Buffers	30	----	A
9. Standardization of a NaOH solution with a Primary Standard	10	----	D
10. Evaluation of Data by the Standard Deviation Method	20	----	D
11. The Molar Mass of a Diprotic Acid	----	50	C
12. A Solubility Product Constant	30	----	A
13. Qualitative Analysis	----	36	C
14. Determination of Iron by Permanganate Titration		30	C
TOTAL	300	136	
COMPRESSED TO	100	100	

- A.** Student works with a laboratory partner.
- B.** Student works with a laboratory partner.
 An unknown will be assigned.
 Student performs unknown analysis individually.
- C.** Student works individually.
 Unknown(s) will be assigned
- D.** Student works individually.
 No unknown(s) will be assigned.

Summary of Grades

Total Lab Reports: (Lab Reports include unannounced Post – Lab Quizzes; Laboratory Notebooks may be consulted)	100 points
Total Unknown Points:	100 points
First Lab Exam:	50 points
Second Lab Exam:	100 points
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TOTAL:	350 points

LABORATORY WORK

In all laboratory work, each student is responsible for the contents of his/her locker. Some experiments are performed individually, while others are performed in pairs. (See Laboratory Schedule and Distribution of Laboratory Grades on page 4 & 5))

For the experiments that are performed in pairs, each student:

1. Must take active part in the work,
2. Report his/her data individually
3. Do his/her own calculations
4. Turn in an individual lab report for grading purposes, and
5. Will be assigned an individual grade for every activity.

Unless otherwise announced by the laboratory instructor, Laboratory Reports are due on the Monday following the week during which the experiments have been performed (this is to allow working students to meet the deadline).

Late reports are accepted with a 20% penalty

After the instructor has returned the graded lab reports to the class, lab reports for that particular experiment are no longer accepted for grading.

In order to work efficiently and meet the required deadline for turning in the lab reports, students are expected to come to the laboratory well prepared.

This means:

1. Read carefully (several times, if needed) the experiment you will perform (both Principles and Procedure) prior to coming to the lab.
2. Think about what you will be doing and plan ahead.
3. Prepare your Laboratory Notebook (see page 9)
4. **THERE IS NO MAKE-UP LABORATORY WORK**

STUDENT LABORATORY PRACTICES AND RESPONSIBILITIES

- **Laboratory safety is everybody's responsibility. As a student in the chemistry lab you are responsible for understanding and following the guidelines below.**
- **Failure to follow the safety guidelines listed below may result in a reduction of your laboratory grade.**

GENERAL PRACTICES:

- Plan and conduct all lab experiments in accordance to established directions and safe practices.
- Report unsafe practices, conditions and injuries to instructor.
- Maintain awareness of current safety or environmental practices
- Exercising reasonable neatness is one of the best ways to avoid accidents and injuries.
- **Consult and follow additional practices posted on the Laboratory Practices link posted on www.proffeny.com**

SAFE PRACTICES IN THE LABORATORY:

- Know locations of exits, fire extinguishers, fire blanket, fire alarm, safety shower, eye-wash stations and broken glass containers in the laboratory.
- Wear eye protection whenever working with flames, concentrated acids and bases or instructed by instructor.
- Restrain long hair, loose clothing and dangling jewelry
- Closed-toe shoes must be worn at all times.
- Clean your work station at the end of the laboratory session from spilled chemicals, used matches, and other debris.
- Close reagent bottles after use, and wipe bottles clean if spill occurs.
- Clean up spilled chemicals immediately, using appropriate procedure.
- Keep containers of flammable liquids away from open flames.
- No eating, drinking, smoking or applying cosmetics in the laboratory.
- Do not perform unauthorized experiments, or use equipment without instructions.
- Do not return unused chemicals to the stock bottle. Share excess chemicals with other students or dispose of them properly.
- Never leave heat sources such as hot plates or Bunsen burners unattended.
- Never work in the laboratory alone.

INCIDENTS

- Report immediately to the instructor all spills and accidents, no matter how minor.
- Wash your hands immediately and thoroughly if they come in direct contact with chemicals.
- In case of a chemical spill, use the emergency spill kit to contain and neutralize the substance.
- In case of broken glassware, do not touch the broken glassware with your bare hands.
Always use a broom and dust pan and discard broken glass in designated broken glass container.

UPON COMPLETION OF YOUR LABORATORY EXPERIMENTS:

- Return all items to their proper locations. These items may include ring stands, wire gauzes, matches, etc. Nothing should be left on the laboratory counter top.
- Dispose of all used chemicals according to the instructions provided by your instructor.
- Shut off all gas, water and vacuum fixtures.
- Return all reagent bottles and sample vials to the instructor bench.
- Clean up workstation from spilled chemicals, used matches and other debris.
- Secure locker on your station.
- Wash hands thoroughly before leaving laboratory.

INSTRUCTIONS FOR LABORATORY NOTEBOOK

You may wish to consult the following documents located under the Laboratory Practices link posted on the www.proffenyes.com webpage.

- **Sample Laboratory Notebook, and**
- **Sample Lab Report**

Each student must have a Laboratory Notebook. In this course, we are using a quadrille paper, hard cover “Comp Book”, available in the LAMC Bookstore and in general office supply stores.

The Laboratory Notebook is used to record data and observations, do calculations, and analyze the results of the lab work.

The Laboratory Notebook must be brought with you to every lab session and all data and observations must be recorded **directly, in ink (no pencil) into the Notebook.**

Laboratory records are legal documents in industry and research. They are required to support patent applications or to resolve disputes or originality of research.

The laboratory notebook is a permanent record of all work performed in the laboratory. It is the place where a scientist records all of his or her data, measurements and observations for future reference. In an academic setting, the lab notebook is the storehouse for all information the researcher will use to write articles for scientific journals. In an industrial setting, the lab notebook is not only the record of the experiments. It is a legal document that may be critical for obtaining a patent. It should contain enough information so that another scientist could read the notebook and repeat the experiment.

The most critical skill that you will be learning is to neatly record all your measurements and observations directly in your lab notebook, at the actual time you make them. It is improper to scribble data on a loose sheet of paper or to rely on your memory to preserve your observations. Learning to keep complete, reliable records is an important part of learning how to become a good scientist. Here is some general information about keeping a lab notebook and also information about the specific sections you should have for each experiment.

General Information

1. Your lab notebook must be hard cover and contain quadrille paper.
2. Write your name, Chemistry 102, your lab section, and semester on the inside front cover or on the first page.
3. **Write only on the front side of each sheet.** The back side of the sheets will be used for calculations and/or as scratch paper.
4. Reserve the first two pages for a table of contents.
5. All entries in your lab notebook must be made in permanent ink. If you make an error, do not attempt to erase it or use a whiteout. Just draw a single line through the incorrect entry.
6. Learn to write in the **past tense**, third person (without the use of personal pronouns such as I, we, and my).
7. Your entries in your Laboratory Notebook are not graded and are for your use only.
You will use the entries of your Laboratory Notebook in several ways:
 - to review your entries, calculations, answers, etc. in order to gain a better understanding of the experiment you have performed,
 - to transfer your data to the Laboratory Report (given in the Laboratory Manual) in a neat and clear matter. Your instructor will grade your Laboratory Reports but not your Lab Notebooks
 - to consult your Laboratory Notebook during the open Lab Notebook laboratory exams.

NOTE: YOU ARE NOT ALLOWED TO RECORD DATA DIRECTLY INTO THE REPORT FORM WHILE YOU ARE PERFORMING THE EXPERIMENT!

Sections of the Notebook For Each Experiment

Title Begin each new experiment on a blank page. Put the full title of the experiment on top of that page. (Write the same title in your table of contents along with the starting page number).

Purpose: Under the title, list the specific objective(s) for the experiment in concise statement(s). Write a short statement (one or two sentences, in your own words) of the **purpose** or the **goal** of the experiment. If the experiment contains more than one part, indicate the objective(s) for all parts of the experiment.

Procedure The procedure should be written in the past tense and third person, including amounts of each reagent used, size of glassware, and equipment(s) used.

NOTE:

The three sections above should be completed before you come in to the lab.

Observations and Measurements.

You should record observations of everything that happens during the experiment, as it happens. Especially pay attention to any change in color, the amount of time it takes for a reaction to occur, unexpected occurrences, temperature readings, amount of solvent used in the reaction, etc. Also write down any modifications you make to the procedure in this section. All numerical data should be recorded directly in the Laboratory Notebook with the proper units.

Calculations

All calculations must be shown in the notebook, including the subtracting of masses to find the mass of a sample, the use of molar mass to convert between mass and moles, etc. Remember to label all numbers with the appropriate units.

Conclusion(s)

The conclusion section should include a restatement of what was accomplished in the experiment, a summary of the results, and an analysis of these results. If the results are different from what you expected, discuss possible sources of error. Also, write down any suggestions you have for improving the procedure.

Questions

Some experiments have a set of questions at the end. No need to copy the question. Just answer each question.