

LOS ANGELES MISSION COLLEGE-SPRING 2017
CHEMISTRY 102-SECTIONS 3164 & 3165
Lecture: MW 5:15-6:40 ; Room: CMS-236
Lab (3164): MW 1:50-5:00 ; Room: CMS-206
Lab (3165): MW 6:50-10:00 ; Room: CMS-210

INSTRUCTOR: Said Pazirandeh
E-MAIL: profpaz@earthlink.net
WEBSITE: www.profpaz.com
or paziras@lamission.edu

OFFICE PHONE: (818)364-7705
OFFICE: CMS 242
OFFICE HOURS: TTH 10:30-11:30 AM
W 3:40-5:00 PM

INSTRUCTOR (Lab 3164) : Bingli Mo
E-MAIL: mob@lamission.edu

OFFICE PHONE: (818) 364-7600 X-4563
OFFICE: CMS 237
OFFICE HOURS: MW 1:00-1:50 PM

INSTRUCTOR (Lab 3165) : Issac Koh
E-MAIL: kohi@lamission.edu

OFFICE PHONE: (818) 364-7600 X-4347
OFFICE: CMS 237
OFFICE HOURS: MW 10:00-10:30 AM

1. **PREREQUISITES:**

- Chemistry 101 with a grade of C or better.

2. **TEXTBOOK:**

- Required: “**Chemistry: A Molecular Approach**”, Nivaldo Tro: 4th Edition (978-1-323-44796-3)
- Copy of the Textbook will be available on Reserve in the Library.
- See helpful hints for selecting textbook available on profpaz.com.

3. **LABORATORY MANUAL:**

- Required: “**Chemistry in the Laboratory**” by J. M. Postma, (7th Edition; ISBN 1-4292-1954-8)
You are required to have your lab manual by the 2nd class meeting.

4. **LABORATORY NOTEBOOK:**

- Required: A bound type lab notebook (carbonless). You are required to have your laboratory notebook by the 2nd class meeting.
- You are required to report all laboratory work in your laboratory notebook. Your lab instructor will provide more information on the requirements for maintaining this lab notebook.

5. **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 Logarithms.
- You are required to have your calculator with you for all class sessions (lectures and labs).

6. **SAFETY GOGGLES**

- Unless specifically instructed otherwise by your instructor, you must wear safety goggles during laboratory work. Safety goggles are available for purchase in the LAMC Bookstore. You are required to have your safety goggles by the second class session. You may keep your goggles locked in your laboratory locker.
- **While in the laboratory, students must wear safety goggles at all times, unless otherwise directed by the instructor. Failure to wear goggles unless directed by the instructor is grounds for dismissal from the lab.**

7. **PERIODIC TABLE OF THE ELEMENTS**

- You are required to have your own Periodic Table of the Elements with you, for all class sessions.
- The particular type of Periodic Table used for this course is available online at my website.

STUDENT LEARNING OUTCOMES

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

GRADING SCALE

- Your grade in the class is composed of the following components:

<i>ASSIGNMENT</i>	<i>POINTS</i>	<i>% OF TOTAL</i>
• QUIZZES (10-11)	175	17.5
• TESTS (3)	300	30
• FINAL EXAM	175	17.5
• LABORATORY REPORTS & UNKNOWNNS	200	20
• LABORATORY EXAMS	150	15
TOTAL	1000	100

- The grading scale in the class is as follows:

A	90% – 100%
B	80% – 90%
C	65% – 80%
D	55% – 65%
F	less than 55%

TENTATIVE LECTURE SCHEDULE*

Week	Date	Text Reference	Topic
1	Feb 6	14.2	Introduction to class – Rates of Reactions
	Feb 8	14.3	Rate Laws-Effect of Concentration
2	Feb 13	14.4	Integrated Rate Laws
	Feb 15	14.5	Temperature & Rate
	Feb 19	-----	Last day to drop without a “W” (online)
3	Feb 20	-----	President’s Day (College closed)
	Feb 22	14.6-14.7	Reaction Mechanisms & Catalysis
4	Feb 27	15.2-15.5	Chemical Equilibrium & Equilibrium Constant
	Mar 1	15.6-15.7	Calculating Equilibrium Constant/Reaction Quotient
5	Mar 6	15.8-15.9	Finding Equilibrium Concentrations/Le Chaterlier’s Principle
	Mar 8	16.3-16.4	Introduction to Acids & Bases/Acid Ionization Constant
6	Mar 13	-----	Test 1 (Chapters 14–15)
	Mar 15	16.5-16.6	pH Calculations for Strong & Weak Acids
7	Mar 20	16.7	pH Calculations for Strong & Weak Acids
	Mar 22	16.8-16.9	Hydrolysis of Salts/Polyprotic Acids
8	Mar 27	16.10-16.11	Acid Strength & Molecular Structure/Lewis Acids
	Mar 29	-----	Test 2 (Chapters 16)
9	April 3-7	-----	Spring Break (College closed)
10	April 10	17.2-Notes	Buffers/Common-Ion Effect
	April 12	17.3	Buffer Effectiveness and Preparation
11	April 17	17.4	Titration & pH Curves
	April 19	17.5-17.6	Selective Precipitation
12	April 24	17.8	Complex Ion Equilibria
	April 26	18.2-18.4	Laws of Thermodynamics
13	May 1	-----	Test 3 (Chapter 17)
	May 3	18.6-18.8	Gibbs Free Energy & Spontaneity
	May 7	-----	Last day to drop with a “W” (online)
14	May 8	18.9-18.10	Nonstandard States/Free Energy & Equilibrium
	May 10	19.2-19.3	Balancing Redox Equations/Voltaic Cells
15	May 15	19.4-19.5	Std. Cell Potentials/Cell Potential, Free Energy and Equil.
	May 17	19.6; 19.8	Cell Potentials & Concentration/Electrolysis
16	May 22	20.2-20.6	Radioactivity & Kinetics of Decay
	May 24	-----	Review for Final Exam
17	May 31 (5:30-7:30)	-----	FINAL EXAM (Chapters 18, 19, 20)

**This schedule is tentative and can be changed based on discretion of the instructor.*

LABORATORY WORK

In all laboratory, each student is responsible for the contents of their locker, and the majority of the experiments are performed individually. The few experiments, which 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.

Laboratory Reports are due on 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** per day.

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, **you must 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 will be doing and plan ahead.**
3. **Prepare your Laboratory Notebook in advance.**

THERE IS NO MAKE-UP LABORATORY WORK
Student laboratory practices and responsibilities

INSTRUCTIONS FOR LABORATORY NOTEBOOK

Each student must have a **spiral bound copy (bottom page) perforated** Laboratory Notebook (100 pages) in which to record data and observations, do calculations, and analyze results of the lab work. The Lab Notebook must be brought with you to every lab session and all data and observations must be recorded **directly into the Notebook** (no where else) **and in ink** (no pencil). 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 a record of the experiment. 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 must learn 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 some information about the specific sections you should have for each experiment.

General Information

1. Your notebook must be bound, having duplicate style sheet. Do not remove original pages from the notebook.
2. Write your name, Chemistry 101, your lab section, and semester on the inside front cover.
3. Write only on the front side of each white sheet. A duplicate copy will automatically appear on the yellow/blue sheet behind it. Apply sufficient pressure to make a legible copy, but not so much that the writing appears on the next pair of sheets. Remember to place the cardboard between each pair of sheets.
4. Unless your lab notebook has a table of contents, 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).

Sections of the Notebook For Each Experiment

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

Objectives. 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 experiment contains more than one part, indicate objective of all parts of the experiment.

Procedure. Procedure should be written in the past tense and third person, including amounts of each reagent used, size of glassware, and equipment(s) used. You may write this either as a paragraph or by numerical order. Use only the left column of the notebook. Right column will be used for observations and data to be recorded.

****NOTE.** The three sections above must be completed **before** your come in to the lab (no lab will be started unless the following sections are completed).

Observations and Measurements. You should record observations of everything that happens during the experiment as it happens using right column of the notebook. 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 notebook with the proper units. Any data recorded by an instrument on another piece of paper, such as spectrum, should be permanently attached into the notebook as instructed. Record the model number of the instrument, the serial number, condition, and setting used.

Calculations. All sample calculations must be shown in the notebook, including the subtracting of masses to find the mass of a sample, the use of density to convert between mass and volume, the use of molecular weight (or molar mass) to convert between mass and moles, etc. Remember to label all numbers with the appropriate units. Your calculation section must include a balanced chemical equation, calculation of the theoretical yield, and calculation of the percent yield of product.

Results. Summarize experimental findings in a tabulated format with correct significant figures and appropriate units.

Conclusion. 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 procedure.

References. Give the **complete bibliographic information** for the laboratory text used. (Title, author, publisher, date).

Questions and Problems. Answer questions and problems assigned either from laboratory manual or provided by your instructor.

LABORATORY SAFETY

- **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 do so may result in a reduction in your laboratory grade.**

General practices:

- Plan and conduct lab experiments in accordance to established directions and **safe practices.**
- Report unsafe practices, conditions and injuries to instructor or department chair.
- Maintain awareness of current safety or environmental practices.
- Exercise reasonable neatness as one of the best ways to avoid accidents and injuries.

Safe practices in the laboratory:

- Know location of exits, fire extinguishers, fire blanket, fire alarm, safety shower, eye-wash stations and broken glass container in the laboratory.
- Wear eye protection whenever working with flames, concentrated acids and bases or instructed by the instructor.
- Restrain long hair, loose clothing and dangling jewelry.
- Closed-toe shoes must be worn at all times.
- Clean your work station at end of laboratory 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 disposed of properly.
- Never leave heat sources such as hot plate or Bunsen burner unattended.
- Do not pipette by mouth. Use mechanical pipettes.
- Never work alone in the laboratory.

Incidents:

- Report all spills and accidents, no matter how minor, to the instructor immediately.
- 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 them in designated broken glass container.

Upon Completion of Your Laboratory Experiments:

- Return all items to their proper locations. These items may include ring stands, clamp rings, 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.

TENTATIVE LECTURE SCHEDULE*

Week	Date	Exp. #	Activity
1	Feb 6	---	Laboratory Procedures; Safety Discussions. Check – In.
	Feb 8	25	The Factors Affecting the Rates of Chemical Reactions
2	Feb 13	25	The Factors Affecting the Rates of Chemical Reactions (cont'd)
	Feb 15	26	The Rate of a Chemical Reaction- Chemical Kinetics
3	Feb 20	---	PRESIDENT'S DAY (College closed)
	Feb 22	26	Chemical Kinetics (cont'd)
4	Feb 27	23	Some Examples of Chemical Equilibria- Le Chatelier's Principle
	Mar 1	23	Some Examples of Chemical Equilibria (cont'd)
5	Mar 6	24	Determination of an Equilibrium Constant by Spectrophotometry
	Mar 8	27	pH Scale and The Titration of Stomach Antacids
6	Mar 13	27	pH Scale and The Titration of Stomach Antacids, continued
	Mar 15	-----	First Lab Exam (You may consult your Laboratory Notebook)
7	Mar 20	28	Determination of the Molar Mass and K_a of a Weak Acid
	Mar 22	28	Determination of the Molar Mass and K_a of a Weak Acid (cont'd)
8	Mar 27	29	What is in your Drinking Water?
	Mar 29	29	What is in your Drinking Water?, (cont'd)
9	April 3-7	-----	Spring Break (College closed)
10	April 10	----	TBA
	April 12	H/O	Buffers
11	April 17	H/O	Buffers (cont'd)
	April 19	---	Second Lab Exam (You may consult your Laboratory Notebook)
12	April 24	30	A Solubility Product Constant of Calcium Iodate
	April 26	30	A Solubility Product Constant of Calcium Iodate
13	May 1	H/O	Qualitative Analysis
	May 3	H/O	Qualitative Analysis (cont'd)
14	May 8	34	Redox: Electron Transfer Reactions
	May 10	34	Redox: Electron Transfer Reactions, continues
15	May 15	36	Electrochemical Cells
	May 17	36	Electrochemical Cells (cont'd)
16	May 22	----	Check Out
	May 24	---	Third Lab Exam (You may consult your Laboratory Notebook)

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