

CHEMISTRY 51 LABORATORY

Ticket Number: 6527

8:50 – 12:00 P.M. Saturday

Room: INST-2012

Instructor: Professor Charles Mallory

Email: charles.mallory@ieee.org

Web Address: <http://themalloryfamily.net/> Check this location often. This location will contain handouts including the lab manual.

Required Materials:

- ☞ Everyday Chemistry Laboratory Manual by Maria Fenyes (**Required NOW**)
- ☞ Periodic Table of the Elements
- ☞ Scientific Calculator
- ☞ Safety Goggles
- ☞ Lab Notebook, This is a quadrille paper, hard cover “Comp Book” (**Required NOW**)

Grading: Your laboratory grade is based upon the following breakdown:

Laboratory Reports	50% (12.5% of total grade)
Laboratory Notebook	10% (02.5% of total grade)
First Laboratory Exam	10% (02.5% of total grade)
Final Laboratory Exam	30% (07.5% of total grade)

Lab Reports: Laboratory reports are due one week after the completion date of the experiment. Late reports may be subject to a 25% per class meeting late penalty.

Lab Exams: Two exams will be given on the scheduled date only. These laboratory exams will be closed book, closed notes with the only resource being your laboratory notebook! **No makeup exams will be given.**

Lab Notebook: The laboratory notebook will be collected and graded twice throughout the semester. Anyone not having the laboratory notebook before the second day of class will be excluded from the laboratory. All notes **MUST** be taken down in the laboratory notebook. You will write you data in the notebook and **then transfer** the data to the laboratory notebooks.

Safety Goggles: During the experiments, unless specifically told by your instructor, you must **ALWAYS** wear safety goggles while in the laboratory. Failure to wear safety goggles will dismiss you from the laboratory. You may purchase your own goggles or you may use the ones provided in the laboratory.

Safety Rules: Failure to follow the safety rules will result in your dismissal from the laboratory. Safety is the responsibility of all persons within the laboratory. Make sure you read the Safety Rules and Regulations and follow all guidelines.

Tentative Laboratory Schedule

Date	Day	Exp. #	Activity
Feb 13, 2010	Saturday	No Class – Presidents Day	
Feb 19, 2010	Friday	Last Day to Add Classes	
Feb 20, 2010	Saturday	N/A	Introduction to Lab; Safety Video, Check in
		1	What Chemists Do; Identification & Analysis
Feb 27, 2010	Saturday	2	Colorful Chemistry with Food Dyes
Mar 5, 2010	Friday	Last Day to Drop classes, without a “W”	
Mar 6, 2010	Saturday	4	Separation of a Mixture of Sand & Salt
		N/A	Periodic Table Video
Mar 13, 2010	Saturday	5	Physical Properties of Household Liquids
Mar 20, 2010	Saturday	Lab Exam (You may use your lab notebook) Lab Notebooks due for grading	
Mar 27, 2010	Saturday	7	Specific Heat of a Liquid - Graphing with Excel
Apr 3, 2010	Saturday	NO Class - Spring Break	
Apr 10, 2010	Saturday	9	Percentage of Copper in Malachite
Apr 17, 2010	Saturday	10	Combination & Decomposition Reactions
Apr 24, 2010	Saturday	11	Single Replacement Reactions
May 1, 2010	Saturday	12	Double Replacement Reactions
May 7, 2010	Friday	Last Day to Drop classes, with a “W”	
May 8, 2010	Saturday	13	Table Salt from Baking Soda
May 15, 2010	Saturday	15	Identification of Metal Ions
May 22, 2010	Saturday	17	Molecular Shape & Polarity
May 29, 2010	Saturday	3	Electrolytes & Nonelectrolytes
Jun 6, 2010	Saturday	N/A	Checkout
		Lab Final Exam (You may use your lab notebook) Lab Notebooks due for grading	

SAFETY RULES AND REGULATIONS

LABORATORY SAFETY IS NOT JUST THE RESPONSIBILITY OF THE INSTRUCTOR.

IT IS THE RESPONSIBILITY OF EVERYONE.

WHILE WORKING IN THE LABORATORY,

You are expected to be Familiar with the Safety Rules
AND TO CONDUCT YOUR LABORATORY WORK IN A SAFE MANNER AT ALL TIMES.

The Laboratory Instructor will review the following Safety rules and regulations with you and will point out the location and operation of the fire extinguisher, safety shower, eyewash, and other laboratory safety equipment available.

1. While in the laboratory, you must wear approved safety goggles, wear shoes, confine long hair, and confine combustible clothing at all times. You will be working with chemicals that will stain clothing if you or your classmates are not careful, you may want to invest in a lab jacket.
2. You are not allowed to eat, drink, or smoke in the laboratory.
3. Before beginning work in the laboratory you should be familiar with the procedures you will be following as well as any special precautions or changes that the instructor may note. Report any unexpected events to the instructor immediately.
4. No unauthorized experiments may be performed. Violators will be subject to disciplinary action. Do **NOT** begin any experiment without the instruction in the classroom.
5. Before leaving the chemistry laboratory, be sure to wash your hands carefully.
6. In the event of an accident, the laboratory instructor should be immediately notified.
 - a. If you receive a chemical burn, immediately flood the area with cold water while another student summons the instructor.
 - b. Treatment for injuries may be obtained only from qualified medical personal.

Laboratory Notebooks

(Note: Your Notebooks will be graded using this criterion.)

General Directions

1. Always write in ink. (NO PENCIL!)
2. Write only on the right-hand side of the page. (The left-hand side of the page should be used for calculations, notes, etc...)
3. Number all right –hand pages in the upper right-hand corner.
4. Just beneath the page number indicate the date on which the laboratory work was done. When the experiment work is done on two different dates, indicate the second date (right –hand margin) at the point where the second day’s work begins.
5. The laboratory notebook is an **original permanent record**. This means several things:
 - a. You must write down all data directly (in ink) in the lab notebook. There will be a grade penalty when a student disregards this rule. (The rule means: no writing in pencil; no writing on the lab report sheet, on pieces of paper, etc...)
 - b. There will be no erasures, no “white out”, and no missing pages. One thin line may be used to cross out offending material. (Later you may discover that you need this information and this way you can retrieve it!)
 - c. **Never Remove a Pager from the Laboratory Notebook.** (At some points this practice could have legal implications; patent fights are won and lost on the legitimacy of lab notebooks.) If you do make a dreadful error and would like to remove a page, do the following: draw a diagonal line across the entire page.
 - d. Holes and spots from chemical spills are legitimate artifacts; do not worry about them.

Format for the Laboratory Notebook

1. Leave one or two pages at the beginning for a **Table of Contents**. On this, list each experiment title (as you perform the experiment) and in a column at the right of the page, give the page number where the experiment write-up starts.
2. Begin each experiment on a fresh right-hand page. Each write-up includes:
 - a. **Title:** At the top of the page give the title of the experiment.
 - b. **Page number and date:** At the top right-hand of each page.
 - c. **Purpose:** Describe what you are doing and why. Describe what information you are attempting to gain by doing this experiment.
 - d. **Procedure:** Give references to the location of the procedure in the text and any deviations from the procedure in the text.
 - e. **Data:** This includes all the observations, measurements, etc... that you make in the laboratory. The data should be presented in tabular form. Check the report sheet to get ideas from the types of tables that are helpful for presenting data for that particular experiment.
 - f. **Results:** These include all the things that you have calculated from the data. Note: results are not calculations, but calculations based on data give results.
 - g. **Discussion & Conclusions:** A short paragraph discussing the results of the experiment. This section should answer the questions from the “Purpose” above. This is the place to mention significant sources of error and the effect they have on the results

Significant Figures

	Example	Sig. Digits	Sci-Notation
1 All non-zero digits are significant			
	1.589	4	1.589E+00
	0.897	3	8.97E-01
	36000	2	3.6E+04
2 Significant Zero's			
a All sandwiched zero's			
	13.02	4	1.302E+01
	1.0002	5	1.0002E+00
	10.5	3	1.05E+01
b All trailing zero's preceded by a digit			
	5.000	4	5.000E+00
	20.000	5	2.00000E+01
	15.00	4	1.500E+01
3 Non significant Zero's			
a Leading Zeros			
	0.0200	3	2.00E-02
	0067	2	6.7E+01
b Trailing Zero's to the left of the decimal point in a number without a decimal point			
	56000	2	5.6E+04
	1360	3	1.36E+03

*NOTE: Write the numbers in exponential notation if you have any doubt. All zeros used to indicate the power of 10 (order of magnitude) are not significant.

Rounding

1 If the last digit to be retained in a number is followed by a number less than 5 (<5),

ROUND DOWN.

Round to 3 significant figures:

28.23	rounds to	28.2
578.1	rounds to	578

2 If the last digit to be retained in a number is followed by a number greater than 5 (>5),

ROUND UP.

Round to 2 significant figures:

5.998	rounds to	6.0
0.00258	rounds to	0.0026
3.6502	rounds to	3.7

3 If the last digit to be retained in a number is followed by 5 (000000... implied),

ROUND the last digit retained to an **EVEN NUMBER.**

Round to 2 significant figures:

1.75	rounds to	1.8
1.050	rounds to	1.0
1.45	rounds to	1.4

Round to 4 significant figures:

67.835	rounds to	67.84
67.885	rounds to	67.88

Calculations

Uncertainty and Significant Figures

The **Least Accurate Number (LAN)** determines the number of digits to which the answer is expressed.

Addition and Subtraction

1. The LAN is the number with the least number of digits following the decimal point.
2. The answer (*sum* or *difference*) can have no more digits *following* the decimal point than the LAN.

Example:

What is the total mass of a mixture made by mixing the following substances?

212	g water (LAN)
1.8	g salt
1.88	g sugar
<hr/>	
215.98	g (incorrect)
216	g (correct)

Multiplication and Division

1. The LAN is the number with the least number of significant figures.
2. The answer (*product* or *quotient*) can have no more significant figures than the LAN.

Example:

Calculate the volume of a rectangular solid that has a length of 4.16 cm, a width of 2.2 cm, and a height of 2.00 cm.

$$\text{Volume} = \text{Length} \times \text{Width} \times \text{Height}$$

$$\text{Volume} = (4.16\text{cm}) (2.2\text{cm}) (2.00\text{cm})$$

LAN

$$\text{Volume} = \del{18.304 \text{ cm}^3} \text{ (incorrect)}$$

$$\text{Volume} = 18 \text{ cm}^3 \text{ (correct)}$$

Hints for a successful Chemistry 51

Chemistry 51 is a demanding course. It demands much time due to the sheer volume of work you must process for laboratory and lecture. It demands much effort to understand and learn the many new ideas presented in the course. You can have a successful, even interesting semester if you practice some of the following hints.

Work on chemistry every day. Do just two or three problems or read just a few sections of the current chapter. You will often need to try a problem several times before you fully understand it. You will need to read the text several times before you really know the material.

YOU CANNOT CRAM CHEMISTRY! DON'T TRY!

Try to stay ahead of the lecture. Skim the anticipated lecture topic the day before the class. Then you know what is in the book and need not take so many notes. You then can **LISTEN AND THINK DURING THE LECTURE**. CAREFULLY READ THE EXAMPLES AND SOLVED PROBLEMS IN THE TEXT. Cover the author's solution and work them yourself immediately after reading the text. Do the suggested *end of chapter* problems. You cannot solve text problems and efficiently without **LOTS OF PRACTICE**. If you cannot solve a suggested problem or don't understand it, reread the appropriate section in the text and review your notes. Look for a similar problem among the text's examples. Think about it for several days. ASK FOR HELP to get started from your instructor or a fellow student.

Look for CONNECTIONS between the current lecture topic and previous topics or your prior knowledge of chemistry or physics. Look for practical applications of what you are learning.

Finally, **DON'T PANIC!** Take the course one step at a time and let your understanding grow. You will be amazed at how much material you have assimilated by the end of the semester.

Period

IA

Periodic Table

VIIIA

1	1 H 1.008	IIA										IIIA IVA VA VIA VIIA					2 He 4.003		
2	3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18	
3	11 Na 22.99	12 Mg 24.31	IIIB		IVB	VB	VIB	VIIB	----- VIII -----			IB	IIB	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
4	19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.47	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80	
5	37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3	
6	55 Cs 132.9	56 Ba 137.3	57 La* 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 190.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.5	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (210)	85 At (210)	86 Rn (222)	
7	87 Fr (223)	88 Ra (226)	89 Ac~ (227)	104 Rf (257)	105 Db (260)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)										

Lanthanide Series*	58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (147)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
Actinide Series~	90 Th 232.0	91 Pa (231)	92 U (238)	93 Np (237)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (249)	99 Es (254)	100 Fm (253)	101 Md (256)	102 No (254)	103 Lr (257)

Code of Academic Honor and Integrity

Los Angeles Mission College

Departments of Physical and Life Sciences

Students at Los Angeles Mission College, because they are members of an academic community dedicated to the achievement of excellence and the pursuit of honor, are expected to meet high standards of personal, ethical, and professional conduct. These standards require personal integrity and a commitment to honesty. Without the ability to trust in these principles, an academic community and a civil society cannot exist. Los Angeles Mission College students and faculty are as committed to the development of students with honesty and integrity as they are to the academic and professional success of its students.

The **Academic Code of Honor and Integrity** is an undertaking of the students, both individually and collectively, that they will:

1. Not give or receive unpermitted aid during exams, quizzes or assignments
2. Not give or receive unpermitted aid in assignments, reports or any other course work that is to be used by the instructor as a basis for grading.
3. Do their share and take an active part in upholding the spirit and letter of the Code of Academic Honor and Integrity.

Some examples of conduct that are regarded as being in violation of the Academic Honor Code include:

- Copying from another's examination or quiz, or allowing another to copy from one's own papers
- Using any unpermitted source of information, human or other, during an exam, quiz or assignment that influences the grade; this includes the use of technological devices
- Any student-to-student collaboration that is unpermitted
- [Plagiarism](#) (plagiarism is defined as the use, without giving reasonable and appropriate credit to, or acknowledging the author or source, of another person's original work)
- Representing as one's own work as the work of another
- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid is not permitted

As a part of the effort to promote and instill an environment of honesty and integrity during quizzes and examinations, the following guidelines will apply for any courses in the Departments of Physical and Life Sciences:

1. Students will leave all books and all other non-essential items (e.g. paper, electronic devices) on the floor or inside their backpacks so that they are not useable nor block the sight line between professor and student. No electronic devices will be in reach.
2. Students will not communicate in any way that will dishonorably assist themselves or another student.
3. Students will leave the room during an exam only if permitted by the professor's policy. If permitted, only one student may leave the room at any time and be gone for only the average length of time needed for the stated purpose. Students will leave all purses, bags, books, phones, jackets, etc., in the classroom during the absence.
4. Students will promote the spirit and letter of the **Code of Academic Honesty and Integrity** by dissuading fellow students from dishonest activity and, when such casual persuasion does not work, informing the professor of the possible dishonest activity, either anonymously, or otherwise.
5. Students will make every effort to avoid the appearance of dishonesty or lack of integrity

Violation of this policy will not be tolerated and violators will be subject to penalties. The success of the **Code of Academic Honor and Integrity** is based upon the collective desire of students, faculty and the community to live in an environment that embraces respect for that which is right – both in the college and in society as a whole.

I have read and understand the Code of Academic Honor and Integrity and will abide by both its intent and its spirit:

Name (print) _____ Signature _____ Date _____