

Dr. Loza

# Chemistry 161

MWF 9:30 - 10:18 AM

Office: CE 280C ☎: 292-5457

Autumn Quarter 2009

1000 McPherson Lab

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Schedule of Assignments

Website: carmen.osu.edu

Textbook:	<u>Chemistry, The Central Science (Eleventh Edition)</u> , by Brown, LeMay, Bursten and Murphy
Lab Manual:	<u>General Chemistry Laboratory Experiments, Volume 1 (2009-9)</u> , by Casey and Tatz
Lab Notebook:	<u>Student Lab Notebook</u> , Hayden-McNeil Publishing, Inc.
Prerequisite:	One unit of high school chemistry and eligibility to enroll in Math 150.
Calculator:	For quizzes and examinations, the use of a calculator is restricted to a TI-30 (any, except XS Multi view),

<u>Week of</u>	<u>Lecture Topic</u>	<u>Chapter</u>	<u>Quiz</u>		<u>Laboratory</u>	
			<u>T / R</u>	<u>T</u>	<u>R</u>	
Sept. 24	Introduction, Matter, Measurement, Significant Figures, Dimensional Analysis ; Atomic Theory and Atomic Structure	1, 2	x	X	Ck, 1	
Sept. 29	Atomic Weights, Periodic Table, Molecular/Ionic Compounds, Naming Inorganic and Organic Compounds; Chemical Equations	2, 3	I	Ck, 1	2	
Oct. 6	Patterns of Chemical Reactivity, Formula Weights, Avagadro's Number, The Mole, Empirical Formulas, Stoichiometry	3	II	2	3	
Oct. 13	Limiting Reagents, Aqueous Solution Properties, Precipitation, Acid-Base, Oxidation-Reduction, Solution Concentration & Stoichiometry	3, 4	III	3	4	
Oct. 20	Chemical Analysis; Light, Energy, Photons, Spectra, Orbitals	4, 6	IV	4	5	
Oct. 27	Electron Configuration; Periodic Table, Charge, Size, Ionization Energy, Electron Affinities	6, 7	---	5	6	
<b>FIRST MIDTERM EXAMINATION - Monday, October 27, 6:30-7:48pm</b>						
Nov. 3	Metals, Nonmetals and Metalloids; Lewis Symbols, Ionic and Covalent Bonding, Lewis Structures	7, 8	V	6	7	
Nov. 10*	Resonance Structures, Molecular Shapes, VSEPR Model, Polarity	8, 9	---	--*	8	
Nov. 17	Covalent Bonding, Orbital Overlap, Hybrid Orbitals, Multiple Bonds, Molecular Orbitals	9	---	8	9, FCO	
<b>SECOND MIDTERM EXAMINATION - Monday, November 17, 6:30-7:48pm</b>						
Nov. 24*	Second Row Diatomic Molecules; Energy, 1 <sup>st</sup> Law of Thermodynamics	9, 5	---	9, FCO	--*	
Dec. 1	Enthalpy, Enthalpies of Reactions, Calorimetry, Hess's Law, Enthalpies of Formation, Strength of Covalent Bonds, Foods and Fuel	5, 8.8	VI	10	10	
<b>FINAL EXAMINATION - Tuesday, December 9, 9:30-11:18am</b>						

\* Nov. 11, 27 & 28 are University holidays. No classes are held. University offices are closed.

\*\* Ck = Check-in. FCO = Finish, Check-Out. x = lab closed.

**Lab Reports for Expts. 1, 2, 3, 4 & 5 are due no later than Friday, [Nov. 21].** (See reverse for late penalty details.)

**All other Lab Reports are due no later than 4:30 PM, Friday, [Dec. 5].** (See reverse for late penalty details.)

**MEDICAL INSURANCE COVERAGE:** Due to the potentially dangerous nature of laboratory work, you are reminded to maintain medical insurance coverage through OSU health service or a private agency when enrolling in Chemistry laboratory courses.

**ACADEMIC MISCONDUCT:** Any material submitted in General Chemistry must represent your own work. Apparent violations of this standard will be referred to the University Committee of Academic Misconduct (COAM) as required by Faculty Rules. *Please read the attached statement on Standards of Academic Conduct carefully and take the quiz in Carmen.*

**IF YOU FAIL TO ATTEND THE FIRST LAB SESSION - CHECK IN AT 100 CE WITHOUT DELAY**

**STUDENT RESPONSIBILITY:** Each student receives this information in the first lecture section. It is your responsibility to read this material and be familiar with the course content, procedures, and grading. You are also responsible for any announcements concerning course procedures which are made in class, whether you are present or not! (If you are absent, you are expected to get notes, announcements, etc. from another student in the class.)

**GRADING:** Your performance in the course will be evaluated on the basis of total points earned. There is **NO** extra credit. The distribution of points is as follows:

Quizzes	150	
Laboratory	200	◀ A minimum of 50% of the total lab points is required to pass the course.
Midterm I	175	
Midterm II	175	
Final	<u>300</u>	
Total	1000 pts.	

**QUIZZES:** Will be given in recitation in the weeks indicated on the front of the syllabus. There are **NO** make-up quizzes but you are allowed to miss one quiz without receiving a penalty or needing permission from your instructor. If you take all of the quizzes, your lowest quiz score will be dropped. **ALWAYS SHOW YOUR WORK ON QUIZZES** to receive full credit. Bring your **approved calculator** to quizzes and exams. Calculator covers must be removed and put away.

**MIDTERM EXAMS:** These exams are given only at the times shown on the Schedule of Assignments. Make-up exams will be given **only** in the **last** week of regularly scheduled classes for medical reasons (documented) or a preapproved university conflict. Exams are a scheduled part of this course and attendance is required (exam location is based on lab section). Students with **University** conflicts should consult the lecturer. Answers will be posted.

**FINAL EXAM:** The final exam must be taken at the University scheduled time. OSU ID cards will be collected at the final exam. Final exams will not be returned.

**LABORATORY:** Consists of one 3-hour session per week; **YOU MAY WORK IN THE LABORATORY ONLY DURING YOUR SCHEDULED LABORATORY PERIOD!** Any time remaining in a lab period and the last lab (checkout) period can be used to complete a previous experiment - *discuss this with your TA first*. A minimum of 50% of the total lab points are necessary for a passing grade in the course.

**LABORATORY NOTEBOOKS:** Will be graded. You are required to use the Student Lab Notebook, and record all entries in ink. Record procedures followed, observations made and data collected, calculations, and results. The notebook should be sufficiently neat and organized so that another person can follow what you did. At the end of each lab, sign your data pages and submit the copies to your lab instructor in order to receive credit for the lab.

**LABORATORY REPORTS:** are normally due at the **beginning** of the lab session **ONE** week after the **completion** of the experiment. Late reports (even if on the same day) will be penalized 10% per day. If you submit a late report to 100 CE, you must notify your TA by email within one day after submission. **NO** credit will be given after 2 weeks or past the due dates shown on the first page. **If you do not check-out, you will receive a zero for your last lab report.** The lab score will be factored to 200 points. *Photocopies of the report sheets are not acceptable.*

**LABORATORY SAFETY REQUIREMENTS:** Students are required to read, understand, and implement the safety precautions indicated in the laboratory manual and laboratory handouts. The precautions are summarized on a safety form which must be signed by all students during their first laboratory period. The following are selected instructions from the safety form:

1. You must wear Department-authorized ANSI code goggles in the laboratory. Goggles will be issued during check-in. After the first free pair, goggles may be borrowed, if available, from CE 231 or 331; otherwise, they must be purchased from CE 180. Not wearing goggles will result in the loss of 10% of the grade for the experiment. For any subsequent violation, an additional loss of 10% of the grade will result. Continued violations may result in dismissal from the course. The wearing of contact lenses is NOT recommended.
2. Each student must adequate clothing to reduce the possibility of injury from chemicals or broken glass. Students who wear **sandals** or **shorts** will be **sent home** – **NO** make-up time will be provided.
3. Familiarize yourself with the location of the fire blanket, fire extinguisher, and eye wash in the laboratory.
4. Promptly report all accidents, no matter how small, to your lab instructor.
5. Your work area should be cleaned before you leave lab. After putting your equipment away, wipe down your work area with a wet sponge or towel. This ensures that you, and other students who use the space, will not be harmed by chemicals left on the desktop. Also clean up spills in the balance room by brushing chemicals into a weighing dish.
6. No unauthorized experiments are allowed. No chemicals may be removed from the lab.

**HOMEWORK:** Homework will not be graded; however, doing assigned problems is often the best way to determine how well you understand the material.

**OFFICE HOURS:** I will be available in my office on Monday, Wednesday and Friday from 8 - 9am and 10:30 - 12 noon.

## ADDITIONAL ASSISTANCE

1. Lab Supervisor - Dr. Tatz (rjtatz@chemistry.ohio-state.edu, 292-8096, 280D CE) will help with lab problems.
2. Extra copies of course handouts are available in the General Chemistry Office, 100 Celeste Lab.
3. You are strongly encouraged to make use of the Learning Resource Center (160 CE) frequently.
4. All students with documented disabilities, who need accommodations, should see the instructor privately to schedule an appointment as early as possible. If your disability requires materials in alternative formats, please contact the Office for Disability Services at 292-3307, Room 150 Pomerene Hall.
5. Undergraduate chemistry web site: <http://www.chemunder.chemistry.ohio-state.edu>

## LEARNING RESOURCE CENTER (TA Aid Room) - 160 CE

The Center is open Monday through Friday during posted hours. Computers that have instructional programs for the General Chemistry classes are available on a first come, first served basis. These programs involve only single-concept problems that must be understood in order to deal with the more difficult multi-concept questions on examinations.

Teaching assistants spend two hours a week in the Center to provide contact time with their students and to answer specific questions about their course as well as general questions in any course. A schedule is posted outside the door which lists the time each T.A. is available as well as their course assignment. Teaching assistants wear a name tag which indicates the course for which they are responsible. There are also two side rooms, 160A and 160C where T.A.'s may be present. The Center has limited space and is not designed as a library or study hall but as a place where students can come for individual instruction and help.

## LABORATORY VIDEO INSTRUCTION

Laboratory videos are shown at the start of the laboratory. Students must view the entire video prior to starting the experiment. Students who are late for laboratory will have to view the video on the computers in the **Learning Resource Center - 160 CE**. A form will be printed in 100 CE which should be picked up and given to the TA in lab.

The videos are designed to supplement the instructions in the laboratory manual. Students will be better prepared to assimilate the video instructions if they have read the laboratory manual prior to the laboratory. The videos are short and there is insufficient time to take detailed notes if you are not already familiar with the experiment. You are encouraged to view the tapes at your own pace either before or after laboratory. The list of videos for this course and run times are as follows:

<i>Expt. #</i>	<i>Title of Video for Chemistry 161</i>	<i>Time</i>
CKIN	Safety in the Laboratory	06:08
1	1st - Use of the Balance - includes Use of the Pipet and Buret (from "Volumetric Analysis")	10:41
2	Separation of Components of a Mixture	---
3	Stoichiometry and the Chemical Equation	14:06
4	Gravimetric Determination of Sulfate	---
5	Determination of the Formula of a Compound	09:50
6	Reactions of Metal Ions	12:36
7	Volumetric Analysis	11:26
8	Oxidation-Reduction Reactions of the Halogens	---
9	Use of the Spectroscope	05:01
10	Molecular Geometry and Bonding	---

Via **petitioning your adviser, Chem 161** may satisfy the Physical Science requirement in the Natural Science category for the GEC, which has these goals and objectives:

**Goals/Rationale:** Courses in natural sciences foster an understanding of the principles, theories and methods of modern science, the relationship between science and technology, and the effects of science and technology on the environment.

**Learning Objectives:**

1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students learn key events in the history of science.
3. Students provide examples of the inter-dependence of scientific and technological developments.
4. Students discuss social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

## **STANDARDS OF ACADEMIC CONDUCT IN GENERAL CHEMISTRY**

**Any material submitted in General Chemistry must represent your own work. Violations of this standard will be referred to the University Committee of Academic Misconduct (COAM) as required by Faculty Rules.**

If you need assistance, check with the staff of the Department of Chemistry. Group efforts by students, use of another student's pre-laboratory or laboratory material, or assistance from individuals who already have taken the course may place you in jeopardy of violation of the standards of General Chemistry. Possession of another student's lab report(s) will raise immediate concerns about academic misconduct. Plagiarism or the submission of work based on old material is considered to be academic misconduct no matter how small the infraction. Identical answers indicate copying or unacceptable group efforts - always answer questions in your own unique words. Identical answers indicate copying or unacceptable group efforts - always answer questions in your own unique words. **Individuals retaking the course must complete all work for the course during the current quarter and may not submit any parts of pre-labs or lab work or reports performed in a previous quarter (see item #6 in "Ten Suggestions for Preserving Academic Integrity", <http://oaa.osu.edu/coam/ten-suggestions.html>).**

Pre-laboratory exercises are designed to make you prepare for the laboratory. Copying answers from other individuals or from old copies of the exercises does not prepare you properly for the laboratory. Evidence of copying or "working together" will be submitted to COAM. The minimum penalty recommended by the Department of Chemistry will be a zero for the pre-laboratory exercise and the accompanying experiment.

Laboratory work is the essence of the science of Chemistry; therefore laboratory work in General Chemistry is to be an individual effort. You will have your own locker/work space and you are expected to perform all parts of the experiments with your own equipment, chemicals and unknowns. The accumulation of data, calculations derived from that data and any conclusions or answers to questions associated with that experiment are to be your own work. Laboratory data may not be altered or "made up". All laboratory work must be done in your assigned laboratory room during your scheduled time period and be supervised by your assigned teaching assistant. You are required to have the data sheet/notebook signed by your teaching assistant during lab. Some courses require the submission of carbon copies of the lab notebook every lab period. Violations will be prosecuted with the minimum recommended penalty of a zero for the entire laboratory portion of the course. If a minimum grade in laboratory is required as stated on the syllabus of the course, the zero can result in an E for the entire course.

Copying, use of "crib" material or use of stored constants and formulas in calculators on quizzes, midterm examinations or the final exam, no matter how small the violation, is regarded as a severe violation of academic standards. The Department of Chemistry will recommend as the minimum penalty a grade of E for the course for any such violations. The use of improper calculators (those NOT listed on the syllabus as approved) may constitute academic misconduct. The staff will inspect calculators used in exams. During exams, students are seated with their lab section to facilitate proctoring of the exam.

Students supplying materials for others to "look at" may be charged with academic misconduct. Never allow another student access to your pre-laboratory exercises or lab reports even after completion of the course. You should not assist others in violations of academic standards. "I didn't know that the person was going to copy my work" is not an acceptable excuse.

**There is a mandatory quiz on Academic Misconduct to be taken on Carmen - <https://carmen.osu.edu> Unless you receive a perfect score on the quiz, you will not receive a passing grade in this course. Please complete the quiz before the end of the first week of the quarter.**

These pre-lab assignments are part of your lab grade. They are due at the beginning of the lab period the experiment is started. You should prepare for each lab by reading the experiment, working the pre-lab problems and preparing your notebook. *Pre-labs from the lab manual should be written on a separate piece of paper, except for Experiment 2 which can be torn out of the lab manual. Pre-labs submitted after the lab is started will receive zero credit.*

<i>Expt #</i>	<i>Title</i>	<i>Pre-lab Assignment</i>	<i>Lab Points*</i>
1	Measurements of Mass and Volume: Density	Page 3 / 1 a, c ( <i>Postlab ques +</i> ) submit at end of 1 <sup>st</sup> lab period	100
2	Separation of the Components of a Mixture	Page 13-14 / 1, 2 b, e, 3	110
3	Development of an Equation	Page 23-25 / 1, 2, 3, 6, 7	110
4	Gravimetric Determination of Sulfate; Semimicro Scale	Page 37 / 2, 4 Computer pre-lab**	110
5	Determining an Empirical Formula	Page 45-46 / 2, 4, 6, 8	110
6	Reactions and Qualitative Determination of Selected Metal Ions	Page 56 / 1 a, b, c, 2 b, 3 b	110
7***	An Acid-Base Titration: Determining Molecular Weight	Page 67 / 1 a, 3, 5 a, b, 6 Computer pre-lab**	110
8	Oxidation-Reduction Reactions of the Halogens	Page 79 / 1 a, b, d, h, 2 b, c 3 a, 4 b	110
9	Emission Spectra	Page 92 / 1, 3, 5	80
10	Molecular Geometry and Bonding	Page 111 / 3, 5	110

\*The laboratory points are factored by 200/950 (Tuesday labs) OR 200/1060 to give 200 course points.

\*\* Computer generated pre-labs (with unique values) are given out in lab one week prior to the experiment or can be picked up in 100 CE.

\*\*\* Tuesday labs will not be able to do experiment 7 due to holidays.

+ Experiment #1 Post-Lab Exercise: Go to the Website: <http://undergrad-ed.chemistry.ohio-state.edu> Click on the "General Chemistry" tab at the top of the web page. Scroll down to the bottom of the page and click on the "Laboratory Notebook Exercise" link. Follow the instructions on the website to complete the assignment.

**Notebooks** - "Student Lab Notebook - OSU Chemistry Dept." (Hayden-McNeil Publishing). Must be written in ink.

- Before lab:* Experiment number and title  
Purpose (one or two sentences)  
Procedure (reference to pages in lab manual and brief outline)
- During lab:* All numerical data (must include label and units) --- *Recorded in Notebook first*  
Other observations --- *Recorded in Notebook first, Not the lab manual*
- At home:* Calculations (*using your own data*)  
Chemical equations  
Results

Notebooks are graded each week as the experiment is being performed. Calculations, chemical equations and results will usually not be complete when the notebook is graded. Your TA will sign your work, write down your grade, and tell you how your notebook could be improved. The copy will be collected each lab period. For more information on lab notebooks, see: <http://undergrad-ed.chemistry.ohio-state.edu/labnotebook/index.html>

**Reports** Cover page containing experiment number and title, student's name, date, TA name

- Purpose; Procedure reference is sufficient (note any changes)  
Report sheet torn out of lab manual (*Photocopies are not acceptable.*)  
Sample calculations (*using your own data*)  
Graphs if applicable  
Answers to questions  
Results or conclusion

Reports are due at the **beginning** of lab one week after the work is completed. A penalty of 10% per day is assessed for late labs. After **two weeks NO** credit will be given. Graded reports should be returned a week after submission - notify your lecturer if they are not. There is a cut-off date for the first four reports and a cut-off date for all reports. For further information on lab reports and examples, see: <http://undergrad-ed.chemistry.ohio-state.edu/labreports/index.html>

## **Homework Problems – 11<sup>th</sup> Edition Brown, LeMay, Bursten and Murphy**

Many of you may have been able to earn high grades in high school chemistry without having to do your homework. We will cover almost all of your high school chemistry in the first 4-5 weeks of this course. We will also go more into depth. Homework is not an option but a necessity. This class is the foundation for Chemistry 122 and 123.

Each Chapter has a Key Skills section. Do you have these key skills? Do the Visualizing Concepts. You may not be able to do them all at the beginning of a chapter but reading through them as we begin each chapter will give you a good idea on key concepts.

I encourage you to do as many problems as you can. The list below is the minimum. Some are easy, others require you to think and figure things out. Worked solutions are posted in Carmen under the Content tab.

**Chapter 1:** 14, 18, 20, 24, 28, 30a, 30b; 36, 37, 40; 43a-c, 48a, 48d; 55, 56, 57, 59, 67, 72, 78, 79, 82

**Chapter 2:** 12, 14, 15; 18, 20, 22, 26, 29, 34; 38, 40, 44-60 even; 61, 64, 66, 68, 70, 72, 76-78; 80, 88, 90, 92a, 95, 97, 98, 101-105

**Chapter 3:** 9, 10-24 even; 27, 28, 34, 36, 38, 42; 44, 46, 48, 50a, 52a, 54; 55, 58-66 even; 67, 68, 72, 74, 78; 81, 84, 90, 97, 99

**Chapter 4:** 11-14, 16, 18; 20-28 even; 30-40 even, 44; 45-47, 50-58 even; 59, 62-74 even; 80, 82, 88; 94, 102, 103; 111.

**Chapter 5:** 11, 17, 28; 23, 24, 29, 30; 32, 33, 38, 40, 42; 47, 48, 49, 51, 53, 55, 56, 58; 62, 64, 68, 72, 74, 75, 77

**Chapter 6:** 10, 12, 13, 16, 18; 22, 25, 26; 32, 34, 36, 37, 44; 47-49, 51, 53, 56, 57; 59, 60, 62, 64-66, 68, 69, 71, 72; 76; 80; 90

**Chapter 7:** 7, 9, 11, 15; 17, 18, 23, 24-30 even, 31, 32, 34, 36; 39, 42-50 even; 58, 60, 62, 63, 64, 66, 68; 69, 71, 74, 77, 79, 82

**Chapter 8:** 7-12; 13, 16, 18-20, 22, 24; 29-44; 45-56; 57, 59, 62, 64; 66, 68, 70; 79, 80, 87, 89

**Chapter 9:** 11-30; 31-38; 39-46; 48; 40-52; 54, 56-58; 59, 60, 62, 64-74; 75, 76, 78, 79, 81, 82, 96

Carmen website - <https://carmen.osu.edu>

Chemistry home page - <http://www.chemistry.ohio-state.edu/~rbartosz>

Reading from your text that should be done PRIOR to lecture

<b>Week of</b>	<b>Monday</b>	<b>Wednesday</b>	<b>Friday</b>	<b>Lab</b>	<b>200 pts</b>
<b>Sep 22</b>		Intro, 1.1-1.5	1.6, 2.1-2.3		
<b>Sep 29</b>	2.4, 2.6	2.6-2.9	2.9, 3.1-3.2	<b>Quiz 1</b>	<b>30 pts</b>
<b>Oct 6</b>	3.2-3.4	3.4-3.5	3.5-3.6	<b>Quiz 2</b>	<b>30 pts</b>
<b>Oct 13</b>	3.7, 4.1	4.2-4.4	4.5-4.6	<b>Quiz 3</b>	<b>30 pts</b>
<b>Oct 20</b>	4.6, 6.1-6.3	6.4-6.6	6.6-6.7	<b>Quiz 4</b>	<b>30 pts</b>
<b>Oct 27</b>	6.8	7.1-7.3	7.4-7.6	<b>MT1</b>	<b>175 pts</b>
<b>Nov 3</b>	7.6-7.8	8.1-8.4	8.5-8.8	<b>Quiz 5</b>	<b>30 pts</b>
<b>Nov 10</b>	<b>DAY OFF</b>	8.6-8.8	9.1-9.3		
<b>Nov 17</b>	9.3-9.4	9.5-9.6	9.7-9.8	<b>MT2</b>	<b>175 pts</b>
<b>Nov 24</b>	9.8	5.1-5.3	<b>DAY OFF</b>		
<b>Dec 1</b>	5.4-5.5	5.5-5.7	5.7	<b>Quiz 6</b>	<b>30 pts</b>
				<b>Final</b>	<b>250 pts</b>

**Quizzes are given in recitation**

**The best 5 of 6 quizzes are counted towards your grade**

**NO Make-up quizzes**

**Quiz 1 (Sep 30 or Oct 2): Chapter 1**

**Quiz 2 (Oct 7 or Oct 9): Chapters 2, 3.1- 3.2 (also Chapter 1)**

**Quiz 3 (Oct 14 or 16): Chapter 3**

**Quiz 4 (Oct 21 or Oct 23): Chapter 4.1- 4.6**

**Quiz 5 (Nov 4 or Nov 6): Chapter 7.1- 7.6**

**Quiz 6 (Dec 2 or Dec 4): Chapter 9**

**Oct 27**      **MT1:Chapters 1-4**

**Nov 17**      **MT2: Chapters 6-8**

**Dec 9**      **Final: 1/3 MT1, 1/3 MT2, 1/3 Chapters 5 and 9**