

Home Page - <http://www.chemistry.ohio-state.edu/~rzellmer>WebCT Site: <https://webct.mps.ohio-state.edu/webct/public/home.pl>

Textbook: "Chemistry, The Central Science", Brown, LeMay and Bursten (9TH EDITION)

Lab Manual: "General Chemistry Laboratory Experiments, Volume 2", Casey and Tatz (2006)

Lab Notebook: "Student Lab Notebook", Hayden-McNeil Publishing, Inc.

Calculator: For quizzes and examinations, the use of calculators is restricted to TI-30 (any letter/suffix); Sharp EL-509; Sharp EL-531; OR Casio FX-250. **NO OTHER CALCULATORS ARE PERMITTED.**

Prerequisite: Chemistry 121 or completion of 101 with a grade of A or A- and eligibility to enroll in Math 151.

<i>Week of</i>	<i>Lecture Topic</i>	<i>Reading</i>	<i>Quiz</i>	<i>Laboratory</i> T/R
Jan 2*	Gas Laws, Ideal Gas Law, Dalton's Law, Kinetic Molecular Theory	10	prequiz	CKIN,11
Jan 9	Real Gases, Intermolecular Forces, Liquids, Vapor Pressure, Phase Diagrams	10, 11	1	12
Jan 16*	Solid Structures and Bonding, Solution Process	11, 13	2	13
Jan 23	Solubility, Solubility Factors, Concentration	13	3	15
Jan 30	Colligative Properties, Colloids, Reaction Rates	13, 14	---	16
FIRST MIDTERM EXAMINATION - Wednesday, February 1, 6:30 PM -7:48 PM (Evening)				
Feb 6	Integrated Rate Laws, Arrhenius Equation, Mechanisms	14	4	17
Feb 13	Catalysis, Equilibrium, K_c Calculations (ICE), Reaction Quotient (Q)	14, 15	5	18
Feb 20	LeChatlier's Principle, Acid-Base Equilibria, Bronsted-Lowry Concept, The pH Scale, Strong & Weak Acids and Bases	15, 16	---	19
SECOND MIDTERM EXAMINATION - Wednesday, February 22, 6:30 PM -7:48 PM (Evening)				
Feb 27	Solutions of Salts, Acidity & Structure, Lewis Concept	16	6	20
Mar 6	Common Ion Effect, Buffers, Titrations	17 - 17.3	7	FCO
FINAL EXAMINATION - Monday, March 13, 11:30 AM -1:18 PM				

* Monday, Jan. 2 and 16 are University holidays. No classes will be held and OSU offices will be closed.

** CKIN = Check-in. FCO = Finish, Check-Out

Lab Reports for 11, 12, 13, 15 and 16 are due no later than Friday, Feb. 24. (See reverse for late penalty details.)**All Lab Reports are due no later than 4:00 PM, Friday, March 10.** (See reverse side for details about late penalties.)**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.***STUDENT RESPONSIBILITY:** Each student receives this information about Chemistry 122 in the first lecture section. It is your responsibility to read this material and be familiar with course content, course 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.)***IF YOU FAIL TO ATTEND THE FIRST LAB SESSION - CHECK IN AT 100 CE WITHOUT DELAY***

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

QUIZZES: Students will take on-line quizzes which will be accessed on the internet using WebCT and a student password. Seven quizzes will be available during the quarter for specific time periods during weeks shown on the front of the syllabus. Questions may be multiple choice, short answer or calculated answer. You will be allowed one attempt within the specific time period. The best five quiz scores will be used in determining the course grade. There are **NO** make-up quizzes.

MIDQUARTER 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. Computer answer sheets from exams will not be returned. 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.

NO HATS ARE TO BE WORN DURING EXAMS!!! (If you wear a hat or other head covering for religious reasons, please see Dr. Zellmer before the exam.)

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 may be used to complete a previous experiment - *discuss this with your TA first*. Read the experiment before you come to lab so that you come prepared to work efficiently and carefully. **A minimum of 50% of the total lab points is necessary for a passing grade for 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. Your **lab notebook sheets must be initialed** by your lab instructor **before leaving the lab** or your report will **not** be graded.

LABORATORY REPORTS: are due at the **beginning** of the laboratory session **ONE** week **after** the **completion** of the experiment. Any report submitted thereafter (even if on the same day) will be penalized 10% per day. If you must submit a late report to 100 CE, you must notify your TA by e-mail within 1 day after submission. **NO** credit will be given after 2 weeks or past the due dates shown on the first page. Lab reports should be graded by your lab instructor and returned one week after submission. The final report will not be graded until you are properly checked out of lab. **If you do not check out, you will receive a zero for the last lab report.** The lab score will be **prorated** 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 -if they are misplaced, goggles may be borrowed from 231/331 CE. 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 wear shoes (not sandals) and adequate clothing to reduce the possibility of injury from chemicals or broken glass.
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. Notes and homework solutions can be found on the web or purchased at COP-EZ at Tuttle Park Place.

OFFICE HOURS: I will be available in my office, 280B Celeste Lab, M, W, F from 9:30-10:30 AM and 12:30-2:00 PM. You can also make an appointment for other times.

ADDITIONAL ASSISTANCE

1. Lab Supervisor - Dr. Tatz (rjtatz@chemistry.ohio-state.edu, 292-8096, 144 CE, office hours by appointment) 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://chemunder.chemistry.ohio-state.edu>
6. The text companion website is: <http://www.pren.hall.com/brown>

LEARNING RESOURCE CENTER (TA Aid Room) - 160 CE

The Center is open Monday through Friday during posted hours. Twenty-four computers have instructional programs for the General Chemistry classes that 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 videotapes are shown at the start of the laboratory. Students must view the entire tape prior to starting the experiment. Students who are late for laboratory will have to view the tape at Classroom Services in Room 11 Lord Hall. (A student I.D. is required to obtain a copy of the tape. Classroom Services opens at 7:00 A.M.). **OBTAIN A CHEMISTRY VIDEO MAKEUP FORM FROM 231 OR 331 CELESTE PRIOR TO GOING TO LORD HALL.**

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

<i>Expt. #</i>	<i>Title of Videotape for Chemistry 122</i>	<i>Time</i>
CKIN	Safety in the Laboratory	07:48
11	Stoichiometry and Gas Volume	----
12	Vapor Density and the Gas Laws	12:53
13	Vapor Pressure and Enthalpy of Vaporization	10:21
15	Variation of Solubility with Temperature and Solvent	----
16	Freezing Point Depression	06:44
17	Spectrophotometric Determination of Cr and Kinetics	10:42
18	Variation of Reaction Rate with Temperature	09:40
19	Equilibria in Chemical Reactions	10:18
20	Quantitative Analysis of a Solution of Two Acids	11:30

Chem 122 is a Physical Science course in the Natural Science category of 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. Individuals retaking the course must redo all work for the course and may not submit any parts of earlier experiments for grading.

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.

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.* **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>
11	Stoichiometry and Gas Volume	None	110
12	The Ideal Gas Law: Determining Molecular Weight	Page 15 / 2, 5 Computer pre-lab**	110
13	Vapor Pressure and Heat of Vaporization	Page 26 / 4, 6, 8 Computer pre-lab**	110
15	Variation of Solubility with Temperature and Solvent	Page 46 / 3, 5, 6, 7	110
16	Freezing Point Depression	Page 55 / 3, 5 Computer pre-lab**	110
17	Determining a Rate Law and Rate Constant	Page 66 / 1 b, d, 2, 3, 5	110
18	Variation of Reaction Rate with Temperature	Page 79 / 1, 2 b, 3, 5 Computer pre-lab**	110
19	Equilibria and Le Chatelier's Principle	Page 88-89 / 1 b, c, 2 a, 3, 6	110
20	Quantitative Analysis of a Solution of Two Acids	Page 103 / 2, 5 Computer pre-lab**	110

* The laboratory points are factored by 200/990 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.

Notebooks - "Student Lab Notebook" (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
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.

Reports

Cover page containing experiment number and title, student's name, date, T.A. name
Purpose; Procedure reference is sufficient (note any changes)
Report sheet torn out of lab manual (*Photocopies are not acceptable.*)
Sample calculations
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.

Voluntary Recitations

There will be 4 recitations held each week during the quarter. Your attendance is totally voluntary. They are being held to provide extra help and will be led by the TAs. It will be your time to ask questions about anything dealing with the course, but will probably generally deal with homework problems or things we've covered in class. During the first week we will be covering WebCT questions concerning quizzes and reviewing some important material from 121. They will be held every Tuesday and Thursday at the following times and locations on each of these days:

10:30 - 11:18 AM **1008 Evans Lab**

1:30 - 2:18 PM **1015 McPherson Lab**

Quizzes

The quizzes will mostly be given on line using WebCT. There will be a quiz every week on line except the weeks we have midterms. Periodically you will get a short 1 or 2 question quiz at the beginning of lab that will be a slightly different format than the on-line quizzes (short-answer, explanatory type questions, etc.). The score from an in-lab quiz will be added to your on-line quiz score for that week. Each quiz will be worth 25 points. We drop your lowest score and then average the other quizzes and multiply this average by 150 to get your total out of 150 (quizzes are worth a total of 150/1000).

There will be a short "learning WebCT" quiz at the beginning of the course, which will be available even before the quarter starts. Hopefully most of you have already taken this but you can still do it. It will be available all quarter and you can take it an unlimited number of times. It is not worth any points. It is just for you to practice taking a quiz using WebCT and on entering numbers in the correct way.

There will be a pre-quiz that is a review of some of the important concepts you learned in 121. These are some of the concepts that if you don't understand you will have problems this quarter. If you look at my "Notes" link on the class web page, I've listed the most important sections from 121 that you should review. You will have unlimited access to the 121 quiz during the first 10 days of class. You will also have access to this quiz before the quarter starts. This quiz will be counted toward your quiz grade.

The remaining quizzes will cover material from 122. Generally speaking each week's quiz will cover the material we've covered in class the week before. This may or may not correspond to what's on the syllabus (i.e., what sections it says will be covered). I will tell you each week what the next week's quiz will cover in class, via e-mail and the class web page. These quizzes will be available for a 48-hour period. You will have **ONE** 30-minute attempt to take the quiz. You will NOT get a second chance. This means you will need to be well prepared to take the quiz (by doing homework, attending office hours and/or the voluntary recitations, going to 160 CE, etc.). Make sure you have a working computer with a good reliable internet connection and allow pop-ups. Please don't try to tell me you didn't have access to a computer or our server went down simply because you didn't get around to taking a quiz. You have a 48-hour window to take a quiz, which should be plenty of time for you to do so. Don't wait until 15 minutes before the window closes since that is all the time you will have for the quiz. We know if our servers are up and running and if you've been logged on and for how long. I realize computer problems occur, but I can check on this. I would suggest you set aside a specific time each week during the 48-hour window during which you take your quiz (just like you would if you took your quiz during a recitation section). Also, consider taking your quiz early during the 48-hour window since it will be likely that fewer students will be taking it then and thus the server will be less busy and less likely to crash (which is actually a very infrequent occurrence).

You are also supposed to work **independently** on the quizzes. The quizzes are **NOT** group projects. WebCT allows us to track IP addresses so we can tell if you have logged onto the same computer as a friend or if somehow you are logged onto two different computers at the same time. Working in a group, getting help on your quiz from someone else or having someone else take the quiz for you is considered academic misconduct.

Considering all the problems you could have it is very important for you to take the "learning WebCT" quiz and the pre-quiz (121 review quiz) as soon as possible. Since you can take both many times, it will make things go much smoother for you and me for the other quizzes. All this being said, if you truly have a problem of any kind you should e-mail me immediately and then you must come to see me about it that day or the next. If you've truly had a problem we will figure out a way to take care of it and this is much easier to do when you see me in person.

HOMEWORK ASSIGNMENTS

Ch. 10 Homework: 3, 4, 6, 9, 13, 16, 19-22, 24, 26, 27, 30, 31, 33, 35, 38, 42, 44, 46, 49, 51, 54-59, 61, 66, 68, 71-73, 76, 78, 79, 82, 85, 88, 89, 92, 96, 97, 99, 100

Ch. 11 Homework: 2, 5, 7, 8, 10, 11, 17, 20, 21, 23, 26, 28, 29, 32, 33, 35-37, 39-41, 44, 48, 49, 52, 53, 55, 56, 60-64, 66, 70, 71, 74-76, 78, 80, 83-85, 91, 93, 98, 100, 101

Ch. 13 Homework: 2-5, 7, 8, 10, 12, 16, 17, 21, 24, 25, 27, 30, 32, 34, 36, 38, 39, 43, 45, 47, 49, 54, 56-58, 60, 61, 63-65, 68, 71, 74, 78, 80, 82-86, 91, 93, 97

Ch. 14 Homework: 1, 3, 6, 8, 10, 11, 13, 15, 20, 23, 26-29, 32, 35, 38, 40, 42, 43, 45, 47-49, 51, 53-55, 58, 60, 62-64, 66, 68, 70, 73, 76-78, 83, 87, 92, 97

AND

Handout in class (or at back of notes or online in homework section)

Ch. 15 Homework: 2, 4, 6, 7, 10, 13, 16, 17, 19, 22, 24, 26, 28, 30, 31, 33, 36, 38, 40, 41, 43-45, 48, 49, 52, 55, 57, 59, 62-64, 66, 68, 69, 71, 72, 76

AND

Handout in class or online in homework section from 8th edition (11-14, 16, 19, 22)

Ch. 16 Homework: 1, 4, 6, 8, 10, 12, 14, 15, 18, 20, 21, 23, 26, 27, 32, 34(b,c), 36(a,d), 39, 42, 44, 46, 48, 52, 54, 56(b,c), 60, 61, 64, 65, 68, 70, 71, 73, 76, 78, 82, 83, 86, 88, 89, 92, 94, 96, 99, 100, 106, 108, 113

Ch. 17 Homework: 1, 4, 7, 10, 11, 14, 16, 18, 19, 24, 26, 28(a,c), 29, 32, 34, 63, 65, 66, 70, 74, 78, 91