



Chemistry 112, General Chemistry Laboratory B

Spring 2019 Syllabus

The following syllabus applies to *all* of the lab sections: Chem 112-001 to 112-014.
Lab Location: Flanner Hall 305

Students can only attend the section in which they are enrolled in LOCUS. Be mindful of day/time and location.

Pre/Co-requisite: Chem 111, Chem 102

Prerequisite: Math Placement Test or Math 117

Laboratory Coordinator: Dr. Katrina Binaku

Office Hours: Monday 3-4pm, Wednesday 12-1pm, and by a scheduled appointment (Check Sakai!)

Office Hours Location: STEM Resource Center in Bremner Center, Centennial Forum

I will *not* meet with students at my office; STEM Resource Center is my office hour location.

Office Location: 104 Flanner Hall

Office Phone: 773-508-8715

Email: kbinaku@luc.edu

Put Chem 112, your section #, and your TA's name in the subject line of all emails

Laboratory Coordinator: Dr. Andrew Basner

Office Hours: Monday 1-3pm, and by a scheduled appointment (Check Sakai!)

Office Location: 428 Flanner Hall

Office Phone: 773-508-3135

Email: abasner@luc.edu

Put Chem 112, your section #, and your TA's name in the subject line of all emails

Laboratory Coordinator: Ketevan Kamkamidze

Office Hours: Monday 1:30-2:30pm and by a scheduled appointment (Check Sakai!)

Office Location: 200A Flanner Hall

Office Phone: 773-508-2687

Email: kkamkam@luc.edu

Put Chem 112, your section #, and your TA's name in the subject

Teaching Assistants (TAs) will be working with all of the Laboratory Coordinators during this course. Specific TAs and TA information will be listed in the Syllabus tab in Sakai. Primary Lab Coordinator information for your section and a copy of this syllabus is also located in the Syllabus tab of Sakai.

The Laboratory Coordinators reserve the right to revise this syllabus in order to correct any unintentional mistakes found at any point of the semester. Students will be notified if any changes have been made.

Welcome to Chem 112. We are looking forward to working with you this semester. Read the entire syllabus to understand the expectations of this course.

COURSE DESCRIPTION

This 2nd semester general chemistry lab course emphasizes qualitative analysis and continues the process of experiments, data collection, and analyzing results. Lab topics are related to some topics/theory covered in the lecture course (Chem 102). The course continues emphasis on lab safety and introduces students to qualitative analysis: physical/chemical separation techniques to isolate and determine ions in an unknown, write net ionic equations, type lab reports & keep a lab notebook, ideal gas law, kinetics, spectrophotometry, acid-base titration & first/second derivative curves, chemical equilibrium, etc. This list is not exhaustive but notes the highlights. Goals of course: 1) demonstrate proper lab safety, 2) extend laboratory skill development built on Chem 111 knowledge, 3) apply qualitative and quantitative techniques to collect experimental data and 4) appropriately interpret experimental results. Outcomes: 1) students properly identify ions in a solution through physical/chemical separation techniques, 2) keep an experimental lab notebook and write scientific lab reports, 3) compute calculations and answer analysis questions coupled to each lab topic.

REQUIRED ITEMS

- 1) Chem 112 Laboratory Packet (provided). It is essential that you read the experiment before coming to class so that you can complete the lab/datasheet in a timely fashion. Bring manual every week.
- 2) Safety goggles. These must be type G, H or K goggles and must meet or exceed ANSI Z87.1 requirements. Safety glasses do not meet our requirements and are not allowed.
- 3) Long-sleeve Laboratory Coat (white is preferred coat color)
- 4) Appropriate clothing and footwear. See below for details*
- 5) Laboratory notebook for qualitative analysis. Composition style bound notebooks are required. A proper notebook has bound pages so they cannot be ripped out. No spiral or perforated notebooks.
- 6) Scientific calculator for most experiments and the practical quizzes. Cell phones are not calculators.
- 7) A non-erasable pen is required for all written work. No white out is allowed.
- 8) Access to a computer outside of lab time to write lab reports for qualitative analysis. There are many on-campus options (computer labs, IC) available if you do not have your own computer.

***Appropriate clothing must be worn that minimizes potential chemical contact with your skin. Shoes that adequately cover the entire foot are required. Sandals, open-toes shoes, perforated shoes, open-backed shoes are not acceptable. No skin should be exposed on your feet or legs, so clothing that covers and protects your body from the waist down (including your ankles) must be worn. Lab coat required.**

GENERAL POLICIES

- All written & Sakai work, as well as TA observations, serve as the basis for earning points and showing progress. Written work is graded with an emphasis on significant digits, consistency of results (data & observations match conclusions), appropriateness/correctness of analysis, and thorough responses.
- All work must be completed in non-erasable pen. This includes notebook, data sheets, homework, and exams. Work not completed in pen or containing “white-out” is subject to point deduction and is not eligible for any regrade requests.
- Completed written work is stored in a lab folder. Each week your TA will distribute this folder to your assigned seat. This functions as a way for TAs to collect/return your work and to be an entire catalog of work completed throughout the semester. All graded assignments must remain inside of the lab folder. You may take the contents of your folder home before an exam in order to study, but everything must be returned when the exam is complete. If there are any discrepancies in grades recorded by your TA, proof of having earned a specific grade on a particular lab is the presence of the graded work in your folder.

- Each student is alphabetically assigned a drawer with glassware and equipment. At the beginning of the semester & semester's end, the drawer contents will be checked for completeness. The drawer is shared with other students over the course of a week. Therefore, it is essential that you clean the equipment used after an experiment is done. Drawers may be checked sporadically. If glassware is broken, the student is responsible for requesting a replacement item; there is no penalty for broken glassware.
- Two exams (qual unknown and practical quiz) covering basic skills and comprehension will be given. In part, a laboratory exam requires a student to demonstrate knowledge/skills by performing tasks in the lab. In this way, a student's ability to use equipment properly and demonstrate correct technique can be evaluated. An exam will also cover basic understanding of the fundamental models of chemistry illustrated in the lab experiments. **You may use your own graded data sheets, lab reports, lab notebook, lab manual, syllabus, and pre-lab lectures from Chem 112 on the exams.**
- Homework and lab reports can never be submitted via email. No exceptions.
- Sakai work cannot be made up. There are no exceptions to this rule.
- Any grading discrepancies on datasheets or in Sakai must be brought to the attention of the Primary Lab Coordinator and/or TA no later than 1-week after the graded work is returned.
- Safety and Clean-up points will be earned on the basis of safe/professional conduct in the lab. A safe lab environment is essential. Any unsafe actions will definitely result in grade degradation. The following is a partial list of ways you can lose safety/clean-up points:
 - Coming late to class, after the pre-lab lecture has started will result in deduction of safety points.
 - Not dressing appropriately for lab. Proper footwear/clothing are required.
 - Not bringing goggles to lab/not wearing your goggles consistently in lab can result in expulsion from the lab. Safety glasses do not meet our safety requirements.
 - Not bringing a lab coat to lab. Not wearing the lab coat properly [buttoned] during lab.
 - Not keeping your equipment drawer or lab space in good condition (i.e. dirty glassware/bench).
 - Leaving your equipment drawer unlocked after lab.
 - Chewing gum, attempting to eat or drink in the laboratory room.
 - Not adhering to Disposal Instructions indicated in each lab handout/pre-lab lecture.
 - The Labquest 2 equipment is breakable and requires special care. You/your partner will be assigned a box to use, and if the equipment is found to have been handled negligently, points will be deducted for both of you from both your safety points and your lab score.

An action, even if not herein, deemed unsafe by TA or Lab Coordinator will result in safety point deductions.

Failure to adhere to lab safety rules can result in expulsion from the lab session and/or course with no opportunity for make-up of the work. Safety must be taken very seriously.

STRUCTURE OF THE COURSE

Laboratory work in second semester general chemistry lab is divided into two parts: Qualitative Analysis (Qual 1, Qual 3, Qual 4, and Qual General Unknown) and Quantitative Analysis (Labs #1-4 and Practical Quiz). Written work must be completed in pen (1-point deduction if in pencil) for the entirety of the semester. Both the Qual General Unknown and Practical Quiz exams are open-note, open book exams.

Part 1) For Qualitative Analysis, you will prepare and use a formal scientific notebook & write formal lab reports for each of the Qual groups covered. Notebooks are graded (2-point deduction each week a proper notebook is not brought to class). This section includes a wet chemistry practical exam, the Qual General Unknown. This unknown potentially contains ions from any of the group experiments covered (Qual 1, 3, 4).

Part 2) The remaining lab experiments are quantitative, cover various topics, and are followed by a written practical quiz. This practical quiz may also include a practical portion question, requiring students to demonstrate a lab technique learned during this semester of lab. Questions on the exam will ask you to analyze data and show the understanding of concepts relating to the experiments performed.

ATTENDANCE/PARTICIPATION

Attendance is mandatory. You are required to come to class every week and can only attend the section in which officially enrolled in LOCUS. There is a point value associated with work accomplished in each class, and you cannot earn points for classes that you do not attend. **There are no makeups allowed i.e. students cannot make up a lab experiment that they missed due to absence. You get a zero for missed work.**

Students are not allowed to make up pre/post-lab quizzes, forums, or other Sakai work. Students are not allowed to make up a lab experiment in another section of Chemistry 112. Make-up exams are rarely allowed, handled on a case-by-case basis. Any granted exam makeup must be completed within 5 business days from absence.

If the university is open, you are expected to attend class and be on time. Points are deducted for those who arrive late. If you arrive after the conclusion of the pre-lab lecture, you will not be allowed to perform the lab due to safety reasons. That counts as an absence; no makeup work allowed. Being sent home for improper clothing/footwear also counts as an absence and no makeup work is allowed.

Review the schedule at the end of the syllabus and consider the negative impact that missing a hands on lab session will have on your educational experience, including performance on the exams. It is in your best interest to register for a section that does not conflict with other obligations. Students should not enroll in a lab section that they cannot fully attend. Missing 2 of the labs, which is nearly 25% of the lab work, is significant and will result in automatic academic failure, as will missing one/both exams, regardless of points earned in the course.

Students participating in co-curricular activities read the following applicable additional information. Students must make information concerning time conflicts with University sponsored events available to the Laboratory Coordinator within the first two weeks of the semester. The Laboratory Coordinator reserves the right to contact the Athletics Department confirming time conflicts and voicing concerns. Students missing class while representing Loyola University Chicago in an official capacity (e.g. intercollegiate athletics, debate team, model government organization) will need to discuss their needs with the Laboratory Coordinator. Sakai work cannot be made up in any circumstances, no exceptions. Laboratory work cannot be made up either; you cannot attend another lab section. These types of absences are handled on a case-by-case basis with remedy.

Students must discuss with faculty the potential consequences of missing laboratory and the ways [if any] this can be remedied. Students must provide the Laboratory Coordinator with proper documentation describing the reason for and date of the absence. The document must be signed by an appropriate Faculty or Staff member, and it must be provided to the Laboratory Coordinator as far in advance of the absence as possible. It is the responsibility of the student to proactively ask about what will be missed during the absence. If a student in co-curricular activities will miss either of the exams [and knows this in advance] it is in the best interest of the student to schedule the makeup exam with the Laboratory Coordinator prior to absence. Any missed practical quiz must be made up within 5 business days of the absence.

Absences during Qualitative Analysis (Qual I, III, IV, and General Unknown) portion of the course:

You cannot perform the Qualitative Analysis General Unknown (exam) without having completed all prior required qualitative analysis labs (Quals 1, 3, 4). Therefore, if you miss one of the qualitative analysis labs, there is a schedule for one make-up, because this content is required in order to take the exam. Any missed qualitative analysis lab must be made up *in sequence* and within one week of the absence. **Normal deadlines will apply for completing homework and pre-lab quizzes.** If you miss more than one of the qualitative analysis labs, it is handled on a case by case basis only in extenuating circumstances. A Virtual Lab is not offered for this portion of the course.

Absences during Quantitative Labs #1-4 portion of the course:

If you miss one of the quantitative experiments, contact your Primary Lab Coordinator immediately. Per policy, you get a zero (0) for the experimental work as these experiments cannot be made up. But, request sample data for the lab missed as it is similar data to what you would have seen in lab; it will help you understand the concepts of the experiment and to study for the exam (Sample data is not the Virtual Lab; sample data is not worth any points whatsoever). **Normal deadlines will apply for completing homework and pre-lab quizzes.**

You may complete a 23-point Virtual Lab (VL) assignment one time in this portion of the course in order to replace an absence in lab (#1-4) that is **unavoidable and for a significantly important reason**. You cannot use it to replace a poor lab or homework score. You cannot use it to replace a qualitative analysis score or absence. You are responsible for understanding missed material. **The due date/time for the Virtual Lab is at the end of the syllabus in the schedule, and is the same for all sections.** The VL is not accepted late. Directions for the VL are at the end of the lab #1-4 lab manual. Turn in a hard copy of the assignment either directly to the Primary Laboratory Coordinator for your section or drop it off in the Chemistry Department Office (Flanner Hall 125) and ask that it be put into your Lab Coordinator's mailbox with verification of the date and time turned in. Do not submit the assignment via email. If you complete the virtual lab, you will not receive any feedback on it until the end of the semester. Direct questions on the VL to your Primary Lab Coordinator.

COURSE REPEAT RULE

Effective as of the Fall 2017 semester, students are allowed only THREE attempts to pass Chemistry courses with a C- or better grade. The three attempts include withdrawals (W). After the second attempt, the student must secure approval for a third attempt. Students must come to the Chemistry Department, fill out a permission to register form or print it from the Department of Chemistry & Biochemistry website:

<https://luc.edu/chemistry/forms/> and personally meet and obtain a signature from either the Undergraduate Program Director, Assistant Chairperson, or Chairperson in Chemistry. A copy of this form is then taken to your Academic Advisor in Sullivan to secure final permission for the attempt.

ROLE OF TEACHING ASSISTANTS

Teaching Assistants (TAs) are an important part of the program, as they provide an additional resource of individual assistance you receive in lab in addition to the Primary Lab Coordinator. In each lab session, your primary interaction could be with a Teaching Assistant. The function of a TA is to help you get good data in a safe fashion, and to provide individual help on each lab when necessary. TAs are given the same grading rubric, mentoring, and management and are meant to help guide you during lab. TAs and Lab Coordinators "CC" each other on all emails sent to/from students; we always know what has been told to a student and when students have emailed a TA or Coordinator. You will get the same assistance from a TA and Coordinator. However, TAs will NOT simply feed you answers and they will not do your work for you. The Laboratory Coordinator role is more behind the scenes: plan the curriculum, prepare handouts and PowerPoints, and train the TAs so the lab experience is educational, fair, and effectively run for students enrolled in all sections. Please know that the Laboratory Coordinator will be in lab too, but may step outside of the lab from time to time to handle appropriate curriculum work. The Laboratory Coordinator is available to you during and outside of the laboratory hours if there are any questions or concerns that the TAs cannot handle appropriately. The Laboratory Coordinator has final authority in all matters relating to the course [the TA does not]. Each TA will keep office hours, posted in Sakai. Utilize both your Primary Lab Coordinator and your TA if you need help.

If at any point during, you want to talk to a Laboratory Coordinator regarding your TA, please do. A TA should enhance your educational experience, not detract from it. If this is not the case, the Coordinator needs to know.

TUTORING

The on-campus Tutoring Center is offering free walk-in tutoring. To see a schedule and more information, visit the Tutoring Center online at www.luc.edu/tutoring. The student American Chemical Society (ACS) chapter also has free on-campus tutoring in Flanner Hall. See Chemistry Dept. office for days and times.

GRADING

Reference the established grading scale below. There will be no change in the grading scale or in the number of points allotted in this course. There are no dropped assignments in this course. There are no weighted grades in the course; it is simply points earned divided by total points possible. A zero (0) is the placeholder for work not completed. Remember that there is no makeup work for laboratory absences; note the policy for Virtual Lab.

The University uses the +/- grading scale system and that system is implemented in this course. Rounding only applies to the final course grade percentage. Sakai reports course grades to TWO digits past the decimal (XX.XX%); this percentage of the final course grade is rounded to the closest integer. For example, an 89.50% or 89.90% (B+) rounds up to a 90% (A-), BUT an 89.30% or 89.45% (B+) round to the integer 89% (B+), as it is the closest integer.

Grades are posted on Sakai within one week of completing the work [hard-copy homework, datasheet, Sakai forum or post-lab quiz]. Pre-lab quiz grades can be seen as soon as the pre-lab work is completed in Sakai. Any grading discrepancies must be resolved within one week after the graded work was handed back to the student and grade displayed in Sakai. Any discrepancies in Sakai [grade input incorrect, for example] must be resolved no later than one week after reviewing the graded assignment. Grade disputes will not be entertained past this point and certainly will not be acknowledged the last day of class. Be mindful of this policy.

Efforts are made to ensure that all Chem 112 TAs uniformly grade the content in this course. On very rare occasions, if it is found there are differences between TA's grading it may be necessary to scale a lab section's averages to adjust. When this is necessary, the average lab score mean is adjusted to the average exam mean.

Grading Scale:

% total	Grade
94 - 100	A
90 - 93	A-
87 - 89	B+
84 - 86	B
80 - 83	B-
77 - 79	C+
74 - 76	C
70 - 73	C-
65 - 69	D+
60 - 64	D
0-59	F

Point Breakdown:

Activity	Points	Origin
a NIEs Worksheet Qual II	10	during lab
a Qual a Prep Hwk	5	sakai
a Qual I/Group 1 Hwk	5	sakai
a Qual I/Group 1 lab report	16	manual
a Qual III/Group 3 Hwk	5	sakai
a Qual III/Group 3 lab report	19	manual
a Qual IV/Group 4 Hwk	5	sakai
a Qual IV/Group 4 lab report	20	manual
e Notebook (35 total) + Qual clean-up points (3 pts per qual = 12 total)	47	in lab
e Qual General Unknown (Practical 1)	20	exam
Significant Figure and Equipment Review Worksheet	10	during lab
Lab 1a: Calcium carbonate pre-lab quiz	4	sakai
Lab 1b: CaCO ₃ datasheet	20	in lab
Lab 1c: CaCO ₃ discussion	4	sakai
Lab 1c: calcium carbonate post discussion quiz	1	sakai
Cleanup points (noted on data sheet)	3	in lab
Lab 2a: Kinetics pre-lab quiz	4	sakai
Lab 2b: Kinetics datasheet	20	in lab
Lab 2c: Kinetics post lab homework	5	sakai
Cleanup points (noted on data sheet)	3	in lab
Lab 3a: Kc HBB pre-lab quiz	4	sakai
Lab 3b: Kc HBB datasheet	20	in lab
Lab 3c: Kc HBB Hwk	5	sakai
Cleanup points (noted on data sheet)	3	in lab
Lab 4a: pKa Nicotinic Acid pre-lab quiz	4	sakai
Lab 4b: pKa Nicotinic Acid datasheet	20	in lab
Cleanup points (noted on data sheet)	3	in lab
Practical Quiz	30	exam
Safety Points	10	in lab
z Check Out	5	in lab
TOTAL POINTS	330	

As stated earlier in the syllabus, makeup work is not given. A zero (0) is recorded for work not completed, absent or not. Sometimes life happens and the Laboratory Coordinator understands that. Information due to absence has been stated earlier in this syllabus. **Normal deadlines apply for all Sakai work. For graphs, lab reports, and homework where a hard copy is required, please turn the assignment into your Primary Laboratory Coordinator, with a note requesting full credit due to your absence the prior lab session.**

EDUCATIONAL GOAL

In this second semester laboratory, our purpose as your Primary Laboratory Coordinator is to continue to provide hands on instruction to experimental methods of scientific investigation in chemistry. The fundamental models of chemistry discussed in lecture will provide the basis for understanding the experimental work. Each lab will provide a practical opportunity for you to gain competence in various techniques of lab work and the practical experience necessary to understand the significance. It is our wish that the lab experience encourages students who are seeking intellectual challenges and understanding of the chemical principles in the laboratory. Conducting experiments and collecting data to test the validity of theories and models requires a different set of skills that those required for success in the lecture part of a general chemistry course. During a laboratory activity, each student's hands, mind, eyes, as well as other senses are focused on the task at hand. Success in the lab involves skills in making perceptive qualitative observations and accurate quantitative measurements.

With each laboratory experiment, relevant questions are posed, and along with TAs, I help each student to execute a laboratory approach which will yield reliable data related to these questions. Each student is required to obtain data and to depend upon this data when answers to relevant chemistry or data analysis questions are drafted. All labs are structured enough so that you should not feel lost or confused, but not so structured that you will find it unnecessary to think for yourself. You must prepare yourself for the laboratory course by reading ahead and comprehending the laboratory manual directions *before* you enter the laboratory.

REGARDING SAKAI AND TECHNICAL DIFFICULTIES

It is *strongly encouraged* that all required submissions to Sakai as well as writing lab reports, opening course/data/experiment files, be done on a reliable wired internet connection [not wireless], that of which the University itself provides in the Information Commons and various computer labs on the Lake Shore Campus. Under NO circumstances will excuses of "technical difficulties" be accepted as this syllabus is stating all students should use a wired internet University computer [not wireless internet] to submit work in Sakai, write lab reports, open course/data/experiment files. This list is not exhaustive and it should be noted that any activities this course may require a computer or internet connection for should be completed using University computers with wired internet connection. Use of home internet [wired or wireless], University wireless, or public wireless is at your, the student's, own risk. It is not prohibited but as Instructor has stated in this syllabus, Instructor is not responsible for technical difficulties of non-University devices [cell phone, tablet, home/work/public wireless internet or computer]. Do not submit items in Sakai using a cell phone or a tablet device as these do not count as reliable internet connection tools. If there are any issues with Sakai due to your choice of internet usage, including having too many tabs open at once, and your work is not submitted or it is submitted in error, there is no remedy. All Sakai homework is 1 attempt; there is no exception to the rule.

ACADEMIC INTEGRITY

The standard of academic integrity and personal honesty delineated in the College of Arts & Sciences Statement on Academic Integrity is expected of every student and will be enforced. Details can be found at http://www.luc.edu/cas/faculty_resources.shtml. Cheating can take many forms in lab, but the most common forms are copying data/answers to analysis questions, sharing homework files, or completing Sakai work with another person. Data and analysis as well as the homework submitted for grading must be your own. If it is not, no credit is awarded for the entire lab & make-ups are not granted. The same policy applies to the lab notebook and typed lab reports. Findings of academic dishonesty are reported to the Chair of the Chemistry Department and to the Dean's Office, and are entered into an individual's record. Copied answers on datasheets, Sakai work, lab reports, or other course work items will result in penalty for all students involved.

DISABILITY ACCOMMODATIONS

If you have a documented disability and wish to discuss academic accommodations, see your primary Laboratory Coordinator by the second meeting of lab. (The Coordinator of Services for Students with Disabilities is located in the Sullivan Center for Student Services and must be contacted independently.)

Necessary accommodations will be made for students with disabilities who procure a SSWD letter. However, to receive any accommodations self-disclosure, proper documentation, and registration with the SSWD office at Loyola University Chicago is required. Accommodations cannot be made until the Primary Laboratory Coordinator receives proper documentation. Furthermore, accommodations are not retro-active and begin only once appropriate documentation has been received by the Primary Laboratory Coordinator in a timely manner. Recognize that the course time scheduled in LOCUS is fixed. No extra time on wet chemistry is given to a student with an SSWD letter; it is not possible. Attendance accommodation forms are filled out and discussed on a case by case basis.

Only those accommodations that are specifically listed in the formal SSWD letter will be provided. If an accommodation suggests the Testing Center be utilized to take an exam, it is the student's responsibility to schedule the testing time in the center [which must be at the same time/date as the class]. The student also must consult & arrange with the Primary Laboratory Coordinator for the in lab practical portion of an exam, which cannot be done in the Testing Center.

SSWD Policies and Procedures can be found here: <http://www.luc.edu/sswd/>

IDEA: Individual Development and Educational Assessment

Objective 1: Learning to apply course materials (to improve thinking, problem solving, and decisions)

- Understand and apply proper labeling to include a value, units, and chemical identity, as well as pertinent stoichiometry and other relevant calculations.
- Understand and apply the rules for obtaining the correct number of significant figures with analysis of personally taken data.
- Execution and analysis of results.
- Analysis and understanding of the meaning of percent relative error.
- Understanding the creating graphs and the meaning of graphs.
- Understanding and analysis of the result of errors in the procedure execution.
- Apply the physical and chemical separation techniques in qualitative analysis to identify ions in an unknown

Objective 3: Gaining factual knowledge (terminology, classifications, methods, trends).

- Competent recording of observations. Color, phase changes and the chemistry involved
- Produce correct Net Ionic Equations and understand their meaning.
- Keeping a proper laboratory notebook and writing lab reports.
- Use best practices with balances and other laboratory equipment.
- Competent use of volumetric glassware and other.
- Understand the reason behind qualitative analysis separation techniques for all qualitative procedures

SAFETY IN THE LABORATORY

Laboratory safety is everyone's responsibility. By registering for and participating in this course you agree to abide by all of the safety precautions, information, and rules provided to you herein as well as in or outside of the laboratory. Failure to follow these rules constitutes grounds for withdrawing the offending student from the lab session and or course at any time.

The Laboratory Coordinator, TA, and University take safety in the laboratory very seriously. Make sure to always listen to information regarding extra safety precautions when applicable. The rules of safety listed on the following page are reviewed during the first day of the laboratory course. Practice safe laboratory conduct during the entire semester and beyond. This list is not exhaustive and it is the student's responsibility to understand the proper, safe conduct when working in a laboratory. Students cannot complete experiments in the course unless the safety lecture and safety form are completed.

By using common sense and following all of the safety rules provided, it is unlikely that you or your classmates will be involved in or injured in a mishap in the laboratory. While it is very important that you do your part to prevent an accident from occurring, it is just as important to know what to do if someone is injured.

There are several key safety features of a laboratory that will be pointed out during the first day of class.

Your commitment to safety [including the following rules] is very important:

1. To always be on time to lab. Coming in late violates safety. Pre-lab lecture starts on time and missing any of its content is unsafe.
2. To wear approved safety goggles¹ and a [buttoned] long-sleeve laboratory coat at all times in the laboratory. Safety glasses are NOT allowed under any circumstances.
3. Non-latex, nitrile glove are optional but *highly* encouraged, especially when working with acids and bases or solvents. Do not wear gloves in the hallway or anywhere outside of lab.
4. To know both the location of and how to use eye washes.
5. Not to wear contacts in the laboratory. Eyeglasses are recommended.
6. To wear appropriate clothing that minimizes potential chemical contact with your skin. A lab coat is required, as are shoes that adequately cover the entire foot. Sandals, open-toe shoes, perforated shoes, open-backed shoes are not acceptable. No skin should be exposed on your feet, ankles, or legs, so clothing that covers and protects your body from the waist down (including ankles) should be worn. You must be dressed appropriately to do experiments.
7. To know both the location of and how to use the safety showers.
8. To know both the location of and how to use the fire extinguishers.
9. To know the proper clean-up and disposal procedure for broken glass.
10. Not to perform unauthorized and unknown experiments, nor work in the lab alone.
11. Not to take chemicals or equipment out of the laboratory.
12. Not to engage in horseplay or any clowning around that may endanger you or other students.
13. Not to eat, drink, chew gum, or smoke anything in the laboratory at any time. No headsets, cell phones, or any other audio devices.
14. Cell phones cannot be used as calculators.

15. To pull long hair back, keeping it away from chemicals and open flame.
16. To keep your lab space clean and tidy. This includes locking your lab locker when done.
17. To ask your Instructor or TA when in doubt about procedures.
18. Inform your Instructor of any health condition you have that might affect your performance or safety in the laboratory.

Preventing an accident or injury from occur is the ideal case scenario, which is why proactively being safe in the laboratory is desired. We live in the real-world and therefore have to be reactive in case of a lab incident. The information provided on the following page are some basic reactive procedures to difference scenarios that have occurred in the laboratory.

Although not a requirement, it can be very helpful if a Laboratory Coordinator knows if a student has a condition that could possibly render an unsafe lab situation (allergies to latex, heart condition, seizure risk, etc.). Do feel free to discuss any concerns you may have regarding health conditions and laboratory work.

If you have any questions regarding the content of this syllabus, including the safety information provided, you are encouraged to discuss all questions/concerns with the Laboratory Coordinator.

FIRST AID BASICS

Minor Cuts: Clean the wound, remove foreign material. Band-Aids are available. (Two Band-Aid rule: If you bleed through one Band-Aid, another should be applied over the first Band-Aid. If you bleed through two Band-Aids in a few minutes, you will be escorted to Health Services). Additionally, if there is any possibility of broken glass in a cut, you will be escorted to the Wellness Center.

Minor Burns from Fire: Immerse affected area in ice water.

Chemicals in Eyes: Immediately flush eyes with water at the eye wash. Continue with flush for at least 10 minutes. Hold the affected eye(s) open to do this properly.

Chemicals on Skin: Rinse affected area with water immediately at the sink or safety shower. If clothing is affected, remove clothes before rinsing! Continue to rinse for at least 10 minutes.

Critical Injuries include: glass in his/her eye(s), serious cuts, severe chemical burns, severe fire burns, seizures. **Immediately call for help using either the lab phone (security number is taped to phone handle) or the emergency phone in the hallway directly outside the laboratory.** Anyone with chemicals or foreign objects in his/her eye(s) will be escorted to the Wellness Center or to the hospital.

FIRE HAZARDS

The primary heat source in this laboratory is the Bunsen burner, which is fueled by natural gas. A lit Bunsen burner is a small, controllable fire, but the heat generated by the burner fire can be quite hazardous in certain circumstances. It can serve as an ignition source for other combustible materials in the lab, such as paper (lab handouts, paper towels, filter paper, etc.), plastics (wash bottle), flammable liquids (acetone, ethanol). A burner fire can also ignite clothing and hair. Proper operation of a burner and the absence of combustible materials in the proximity of the burner will significantly reduce the risk of a fire.

Keep chords and paper products away from laboratory hotplates. Always make sure hot plates are off & unplugged before leaving the lab. Avoid spilling chemicals on hot plates.

Labs are equipped with several fire extinguishers, safety showers, and a fire blanket. Use in a fire emergency.

In a case of a fire:

Remain calm; alert the instructor and your immediate neighbors.

Personal safety, yours and others in the labs, is always the top priority.

A small fire in a small container can be suffocated by covering it with a watch glass or inverted beaker.

With a somewhat larger fire, decide whether or not you think you can control it with a fire extinguisher.

Use of a Fire Extinguisher:

Located by the doors in both labs; a back-up fire extinguisher is located at the west end of the floor.

Maintain an escape position; i.e. stay between the fire and the doorway.

Break the plastic ring, pull out the metal ring, release the hose from the bracket, direct the hose at the base of the flames, and press the lever down. PASS (pull, aim, squeeze, sweep).

Note: Fire extinguishers are heavy and not particularly easy to direct. These are multi-purpose, dry chemical extinguishers, safe for anything we use in lab.

When in doubt about any of these safety procedures, ask the Lab Coordinator. Safety is of utmost importance and signing the safety form on the first day of class signifies your commitment, understanding, and following of all safety rules herein the syllabus and additional verbal safety information given to you during or outside of the laboratory course.

LOST AND FOUND

Any items mistakenly left in lab will be taken to the Chemistry Department office, Flanner Hall 125, and can be identified and claimed there. **Please put your name on your data sheets, lab manuals, calculators, notebooks, goggles, tag of your lab coat, and other personal items.**

Tentative Chem 112 Order of Lab Experiments

	Qual Prep, Net Ionic Equations
Qual	Qualitative Analysis 1 / Group I Ions
Qual	Qualitative Analysis 3 / Group III Ions
Qual	Qualitative Analysis 4 / Group IV Ions
Qual	Qualitative Analysis General Unknown (Practical/Exam #1)
	Significant Figure Review / Quant / Equipment Review
Lab #1	Percent Calcium Carbonate (CaCO_3) in a Mixture
Lab #2	Kinetics: Iodination of Acetone
Lab #3	Using Spectroscopy to Determine the Equilibrium Constant for Bromothymol Blue
Lab #4	Determination of the pKa and Molar Mass of Nicotinic Acid
Make-up (not extra credit)	Virtual Lab: Determine the Concentration of an Unknown NaCl Solution

Semester schedule of laboratory work on the next page



It is your responsibility as a student to know what lab experiment is being completed on each day your lab section meets and what is due each week in class or in Sakai.

**Tentative Semester Schedule of Chem 112 Laboratory
Spring 2019**

Month	Mon	Tue	Wed	Thu	Fri
Jan 2019	14 Intro/Safety	15 Intro/Safety	16 Intro/Safety	17 Intro/Safety	18 Intro/Safety
	21 MLK DAY No Lab	22 Qual Prep	23 Qual Prep	24 Qual Prep	25 Qual Prep
	28 Qual Prep	29 Qual I	30 Qual I	31 Qual I	1 Qual I
Feb 2019	4 Qual I	5 Qual III	6 Qual III	7 Qual III	8 Qual III
	11 Qual III	12 Qual IV	13 Qual IV	14 Qual IV	15 Qual IV
	18 Qual IV	19 Qual Unknown	20 Qual Unknown	21 Qual Unknown	22 Qual Unknown
	25 Qual Unknown	26 Qual Makeup	27 Qual Makeup	28 SF/Quant/Equip	1 SF/Quant/Equip
Mar 2019	4 Spring Break	5 Spring Break	6 Spring Break	7 Spring Break	8 Spring Break
	11 SF/Quant/Equip	12 SF/Quant/Equip	13 SF/Quant/Equip	14 Lab #1	15 Lab #1
	18 Lab #1	19 Lab #1	20 Lab #1	21 Lab #2	22 Lab #2
	25 Lab #2	26 Lab #2	27 Lab #2	28 Lab #3	29 Lab #3
Apr 2019	1 Lab #3	2 Lab #3	3 Lab #3	4 Lab #4	5 Lab #4
	8 Lab #4	9 Lab #4	10 Lab #4	11 Practical Quiz	12 Practical Quiz
	15 Practical Quiz VL due by noon	16 Practical Quiz	17 Practical Quiz	18 Easter Break No Lab	19 Easter Break No Lab
	22 Easter Monday No Checkout for Monday labs	23 Check Out	24 Check Out	25 Check Out	26 Check Out

There is no final exam in Chem 112. Checkout week is the last week of class attendance.