

Chem 173 General Chemistry for Engineers Laboratory

Fall Semester 2024

Requirements: Chem 171 should be taken concurrently with or before Chem 173 and MATH 118 or Math Placement Test

Instructor: Dr. Conrad Naleway, Flanner Hall 200C, phone 508-3115, E-mail: cnalewa@luc.edu Office hours, Fridays 10:30- 11:20 AM and Zoom Wednesdays at 5 PM or by appointment.

Teaching Assistant: Richa Khatiwada: rkhatiwada@luc.edu
Office hour: Tuesday 9-10 AM in Flanner 314A.

Class Materials:

You will need one bound laboratory notebook, such as a National-brand composition book sold in Barnes and Noble or Beck's bookstore. You will need laboratory goggles and a lab coat. All of which are available at the bookstore.

Other Materials: You will need an inexpensive calculator having logarithmic (base 10 and base e), exponential, and trigonometric functions to do routine mole-mass and volumetric calculations associated with this lab.

Objectives:

- To acquaint students with fundamental concepts of chemistry and good laboratory practices.
- To teach wet chemical lab skills, efficiency, and planning of experiments.
- Teach critical evaluation of experimental results.
- To acquaint students with proper ways to write and present their experimental results

Learning Outcomes:

- Understand and demonstrate safe laboratory practices.
- Use laboratory generated data to reach sound conclusions about chemical phenomena.
- Learn the proper use of an analytical balance
- Develop good laboratory practices in conducting experiments and reporting experimental results.
- Observe and interpret chemical reactions: color change, temperature change, precipitate formation, and gas evolution
- Learn the proper use of a digital pipet.
- Understand Beer's Law
- Learn how to perform a titration and calculate equilibrium constants from the data.

Laboratory Procedures: The lab will be conducted in Flanner Hall 016 Tuesdays and Thursdays from 2:30 PM to 5:15 PM. Students will work in pairs for most labs. You will be given the lab manuals that are pertinent to each lab assignment beforehand. You will be required to take a pre-lab quiz to demonstrate you are prepared for lab. Pre-lecture will be typically embedded in the lecture meetings, while the lab meetings will have a short demonstrations to begin with. We will provide you with handouts before lab and explain the procedures and goals for each assignment prior to its execution. The instructor will explain during the first lab period of the semester how the notebook is to be written. You will be required to construct data sheets to present your data for grading for each of the ten labs. The instructor will explain how this is to be done during the pre-lab lecture. **You will need to sign in for lab when you enter FH-016 and get your TA's signature for your lab notebook and then sign out.**

Required Course Materials

- Loyola email, Sakai (and integrated tools), Zoom, and possibly additional software.
- Scientific Calculator and another computational device such as a tablet or computer.
- Laboratory Procedures are in Lectures section in Sakai and will also be handed out at beginning of classes.

Student Accommodations

If you have any special needs, please let me know in the first week of classes. The university provides services for students with disabilities. Any student who would like to use any of these university services should contact the Student Accessibility Center (SAC), Sullivan Center, (773) 508-3700. Further information is available at <http://www.luc.edu/sac/>. Also see <https://www.luc.edu/sac/faculty/facilitatingaccommodations> for guidance about implementing various kinds of accommodations in a way that is appropriate to your class. The Student Accessibility Center stands ready to work with you.

Information about Academic Integrity: Academic integrity is the pursuit of scholarly activity in an open, honest, and responsible manner. Academic integrity is a guiding principle for all academic activity at Loyola University Chicago, and all members of the University community are expected to act in accordance with this principle. Please open and read the foldout for the third item, "Academic Integrity" in the [Undergraduate Academic Standards and Regulations](#). Academic dishonesty can take several forms, including, but not limited to cheating, plagiarism, copying another student's work, submitting false documents, and deliberately disrupting the performance of other class members. Standards apply to both individual and group assignments.

Exams and Academic Honesty: Any instance of academic misconduct (including those detailed on the website provided above or in this syllabus) will be reported to the Department Chair and the academic Dean's office. **Academic dishonesty of any sort will not be tolerated. Students caught cheating during an exam or who have someone else take it for them will receive an F grade for the course.**

Grading: Each of the (ten) prelab quizzes are worth 1.5% (15% total). The lab notebook is worth 5% of your grade. Each lab (worksheet) is worth 8% of your grade (80% total). Lab worksheets are due one week after the lab (**at the very beginning of the next lab**). Turning in a worksheet late will result in a loss of 10% of your grade every week that it is late.

Grading Scale:

A 100-93; A- 92-89; B+ 88-85; B 84-81; B- 80-77; C+ 76-73; C 72-69; C- 68-65; D 64-57; F <56.

Policy on missed assignments: **Skipping a Lab period is highly discouraged.** You will be allowed **only one make up or one redo lab** during the semester. Any make up lab or exam will have to be done on the student's own time, not during a regular lab period.

Notes concerning laboratory assignments: We will be collecting and grading laboratory notebooks periodically. Please come to lab prepared. You should have a brief outline of your procedure for that period written in lab notebook as discussed in an earlier lab period.

Regarding the use of Artificial Intelligence: In this course, any work you submit for credit must represent your own ideas and understanding of the assigned material. If you are uncertain about any case where your use of AI may be in conflict with university or course standards, please see me to discuss your concerns.

Evaluation and Grading and Universal Absence Accommodation Policy: The purpose of a universal absence accommodation policy is to account for emergency circumstances (e.g., serious illness, caring for a family member, car accident) that require you to be absent from class, while maintaining fairness in grading for students who attend and complete all in-class graded assignments. We believe that class attendance and participation are essential for your success in this class, and that your health is important to us and our shared community. Please use good judgement and stay home if necessary/prudent for your circumstances. If you miss an exam due to illness or some other reason, this will be your dropped grade. If you miss another exam, then you **MUST** have a valid excuse (e.g. doctor's note) to have a make-up exam arranged.

NOTICE OF REPORTING OBLIGATIONS FOR RESPONSIBLE CAMPUS PARTNERS:

As an instructor, I am a Responsible Campus Partner ("RCP") under Loyola's **Comprehensive Policy and Procedures for Addressing Discrimination, Sexual Misconduct, and Retaliation** (available at www.luc.edu/equity). While my goal is for you to be able to engage fully and authentically with our course material through class discussions and written work, I also want to be transparent that as a RCP I am required to report certain disclosures of sexual misconduct (including sexual assault, sexual harassment, intimate partner and/or domestic violence, and/or stalking) to the **Office for Equity & Compliance** ("OEC"). As the University's **Title IX** office, the OEC coordinates the University's response to reports and complaints of sexual misconduct (as well as discrimination of any kind) to ensure students' rights are protected.

As an instructor, I also have an obligation under Illinois law to report disclosures of or suspected instances of child abuse or neglect. <https://www.luc.edu/hr/legal-notices/mandatedreportingofchildabuseandneglect/>

The University maintains such reporting requirements to ensure that any student who experiences sexual/gender-based violence receives accurate information about available resources and support. Such reports **will not generate a report to law enforcement** (no student will ever be forced to file a report with the police). Additionally, the University's resources and supports are available to all students even if a student chooses that they do not want any other action taken. If you have any questions about this policy, you are encouraged to contact the OEC at equity@luc.edu or 773-508-7766.

If you ever wish to speak with a **confidential** resource regarding gender-based violence, I encourage you to call **The Line** at 773-494-3810. The Line is staffed by confidential advocates from 8:30am-5pm M-F and 24 hours on the weekend when school is in session. Advocates can provide support, talk through your options (medical, legal, LUC reporting, safety planning, etc.), and connect you with resources as needed -- *without* generating a report or record with the OEC. More information about The Line can be found at luc.edu/wellness.

USE OF APPROPRIATE NAMES AND PRONOUNS:

Addressing one another at all times by using one's chosen modes of address (including preferred names and gender pronouns) honors and affirms individuals of all gender identities and gender expressions. Misgendering and heteronormative language excludes the experiences of individuals whose identities may not fit within a gender binary, and/or who may not identify with the sex they were assigned at birth.

If you wish, please share your gender pronouns with me and the class when you introduce yourself, on your name placard, and/or on your Zoom profile. If you do not wish to be called by the name that appears on the class roster or attendance sheet, please let me know privately and I will work diligently to honor your wishes. My goal is to create an affirming environment for all students so that everyone can learn and engage as our full and true selves.

Attendance

Additional Dates: Please be aware of the University Schedules which include drop dates and holidays: www.luc.edu/academics/schedules

Accommodations for Religious Observances: If you have observances of religious holidays that will cause you to miss class or otherwise effect your academic work in the course, you must alert the instructor no later than Friday of Week 2 in the semester to request accommodations. ***Advance notice must be sent to the instructor through Loyola email by this deadline.***

Loyola University Absence Policy for Students in Co-Curricular Activities (including ROTC): Students missing classes while representing Loyola University Chicago in an official capacity (e.g., intercollegiate athletics, debate team, model government organization) shall be allowed by the faculty member of record to make up any assignments and to receive notes or other written information distributed in the missed classes. Students should discuss with faculty the potential consequences of missing lectures and the ways in which they can be remedied. Students must provide their instructors with proper documentation i.e., "[Athletic Competition & Travel Letter](#)" describing the reason for and date of the absence. This documentation must be signed by an appropriate faculty or staff member, and it must be provided to the professor in the first week of a semester. It is the responsibility of the student to make up any assignments. If the student misses an examination, the instructor is required to allow the student to take the examination at another time. (<https://www.luc.edu/athleteadvising/attendance.shtml>) Students who will miss class for an academic competition or conference must provide proper documentation to their instructor as early in the semester as possible. ***Advance notice must be sent to the instructor through Loyola email.***

Information about Accessibility Support and Student Support: Requests for Accommodation

Loyola University Chicago provides reasonable accommodations for students with disabilities. Any student requesting accommodations related to a disability or other condition is required to register with the Student Accessibility Center (SAC). Professors will receive an accommodation notification from SAC, preferably within the first two weeks of class. Students are encouraged to meet with their professor individually in order to discuss their accommodations. All information will remain confidential. Please note that in this class, software may be used to audio record class lectures in order to provide equal access to students with disabilities. Students approved for this accommodation use recordings for their personal study only and recordings may not be shared with other people or used in any way against the faculty member, other lecturers, or students whose classroom comments are recorded as part of the class activity. Recordings are deleted at the end of the semester. For more information about registering with SAC or questions about accommodations, please contact [SAC](#) at 773-508-3700 or SAC@luc.edu. *If you use the Testing Center, please schedule all of the tests for this class at the beginning of the semester. If a scheduled test date changes, you will still be accommodated if you had scheduled your test in advance. If you have any questions or concerns regarding the implementation of your accommodations in this course, please contact the SAC for assistance.*

Pass/Fail Conversion Deadlines and Audit Policy: A student may request to convert a course into or out of the "Pass/No-Pass" or "Audit" status only within the first two weeks of the semester. For the Fall 2024 semester, students are able to convert a class to "Pass/No-Pass" or "Audit" through Monday, September 9th. Students must submit a request for Pass/No-Pass or Audit to their Academic Advisor.

Course Repeat Rule: Effective with 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). The Department advises that it is preferable to complete a course with a grade of C or C-, and to demonstrate growth in future coursework, than to withdraw from a course. After the second attempt, the student must secure Department approval for a third attempt. Students must fill out the [Permission to Register Form](#), and arrange a meeting with the Undergraduate Program Director, Assistant Chairperson, or Chairperson in Chemistry. If approved, a signed copy of this form is then sent to the student's Advising office to secure final permission for the attempt.

Health, Safety, and Well-Being On-Campus

Please be familiar with and adhere to all policies and protocols posted on the Campus Info & Resources site: <https://www.luc.edu/healthsafetyandwellbeing/campusinforesources>

Copyright/Intellectual Property reminder: Course materials provided by your instructors at Loyola, including my materials, may not be shared outside any course without the instructor's written permission. Content posted without permission will be in violation of Copyright/Intellectual Property laws. Class meetings may not be recorded without the instructor's written permission. (e.g., <https://www.luc.edu/ool/onlineteachingguidelines/guidelinesforrecordingstudentsduringonlineclasses/>)

Recording of online class meetings: In this class software will be used to record live class discussions. As a student in this class, your participation in live class discussions will be recorded. These recordings will be made available only to students enrolled in the class, to assist those who cannot attend the live session or to serve as a resource for those who would like to review content that was presented. All recordings will become unavailable to students in the class when the Sakai course is unpublished (i.e. shortly after the course ends, per the [Sakai administrative schedule](#)). Students who prefer to participate via audio only will be allowed to disable their video camera so only audio will be captured. Please discuss this option with your instructor. The use of all video recordings will be in keeping with the University Privacy Statement shown below

Privacy Statement: Assuring privacy among faculty and students engaged in online and face-to-face instructional activities helps promote open and robust conversations and mitigates concerns that comments made within the context of the class will be shared beyond the classroom. As such, recordings of instructional activities occurring in online or face-to-face classes may be used solely for internal class purposes by the faculty member and students registered for the course, and only during the period in which the course is offered. Students will be informed of such recordings by a statement in the syllabus for the course in which they will be recorded. Instructors who wish to make subsequent use of recordings that include student activity may do so only with informed written consent of the students involved or if all student activity is removed from the recording. Recordings including student activity that have been initiated by the instructor may be retained by the instructor only for individual use.

Disabilities Accommodations: If you have a documented disability and wish to discuss academic accommodations, please see your instructor by the second meeting of lab. (The Coordinator of Services for Students with Disabilities is located in the Sullivan Center for Student Services, Suite 260, 508-7714 and must be contacted independently.)

LOST AND FOUND: Any items mistakenly left in lab will be taken to the Chemistry Department office, 125 Flanner Hall, and can be identified and claimed there. Please put your name on your data sheets, lab manuals, calculators and other personal items.

ACADEMIC INTEGRITY: All students in this course are expected to have read and to abide by the demanding standard of personal honesty, drafted by the College of Arts & Sciences, which can be viewed at: <http://www.luc.edu/media/lucedu/cas/pdfs/academicintegrity.pdf>

Anything you submit that is incorporated as part of your grade in this course (e.g., quiz, examination, homework, and discussion sheet) must represent your own work. Any students caught cheating will, at the very minimum, receive a grade of “zero” for the item that was submitted, and this grade cannot be dropped. If the cheating occurred during a course exam, the incident will be reported to the Chemistry Department Chair and the Office of the CAS Dean. Depending on the seriousness of the incident, additional sanctions may be imposed.

Appropriate in Class Behavior and use of Electronic Devices: Rude, disruptive behavior (such as viewing computer materials not concerning class subjects, texting or talking on phones...) will not be tolerated. Voice recording but not visual recording is allowed for pre-lab lectures. Cell phones, pagers, wireless PDAs, etc. must be turned off during lab. If your device is activated during lab, you must leave the lab immediately and cannot return for the duration of that lab period.

Safety in the Laboratory: Laboratory Safety is everyone's responsibility. By registering for and participating in this course you agree to abide by the following rules. Failure to follow these rules constitutes grounds for withdrawing the offending student from the lab session and or course at any time.

- To always wear approved safety goggles at all times in the laboratory.
- To know both the location of and how to use eye washes.
- Not to wear contacts in the laboratory.
- To wear appropriate clothing 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) should be worn.
- You must be dressed appropriately to perform an experiment, including your **lab coat and goggles**.
- To know both the location of and how to use the safety showers.
- To know both the location of and how to use the fire extinguishers.
- Not to perform unauthorized and unknown experiments, nor work in the lab without appropriate supervision.
- Not to take chemicals or equipment out of the laboratory.
- Not to engage in horseplay or any clowning around that might endanger you or other students.
- Not to eat, drink, chew gum, or smoke anything in the laboratory at any time. No headsets or cell phones.
- To keep your lab space clean and tidy.
- To ask your instructor or TA when in doubt about procedures.

By using common sense and following these rules, 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. 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.

First Aid Basics:

- **Minor Cuts:** Band-Aids are available. If you bleed through one Band-Aid, another should be applied over the first. If you bleed through two Band-Aids in a few minutes, or if there is any possibility of broken glass in a cut, you will be escorted to the Wellness Center.
- **Minor Burns from Fire:** If the skin is unbroken, run cool water over the area or submerge in a cool water bath for at least 5 min. Apply a cool, damp towel.
- **Chemicals in Eyes:** Immediately flush eyes with water at the eye wash. Continue with flush for at least 10 minutes. You will probably need to hold the affected eye(s) open to do this properly.
- **Chemicals on Skin:** Dust any dry chemical off with a dry towel and then flush with water. Flush any wet chemical from the skin immediately with water at the sink or safety shower. If clothing is affected, remove clothes before rinsing! Continue with rinse for at least 10 minutes.
- **Fire Hazards:** Each lab is equipped with a fire extinguisher, fire blanket, and safety shower, which should be used in a fire emergency.
- **Procedure 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, you need to 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.

Note: the fire extinguishers are heavy and not particularly easy to direct. Recommend that faculty and graduate students should use if practical. These are multipurpose dry chemical extinguishers, safe for anything we use in lab.

Tentative Schedule for Fall 2024:

WEEK	TUESDAY	THURSDAY	
1	8/27/24	8/29/24	Check in, Review of Syllabus, Lab Safety orientation, Lab Notebook, Review of Significant Figures.
2	9/3/24	9/5/24	Lab 1 Chemistry of Ordinary Materials
3	9/10/24	9/12/24	Lab 2 Calibration of a Digital Pipette
4	9/17/24	9/19/24	Lab 3 Thermochemistry, Determining specific heats of Metals
5	9/24/24	9/26/24	Lab 4 Energy Relationships in Chemical Equations
6	10/1/24	10/3/24	Lab 5 Percent Calcium Carbonate in a Mixture
7	10/8/24	10/10/24	MID-TERM WEEK (Mon-Tue)
8	10/15/24	10/17/24	Makeup(1-5)
9	10/22/24	10/24/24	Lab 6: Group 1 Qualitative Analysis of Unknowns
10	10/29/24	10/31/24	Lab 7: Group 3 Qualitative Analysis of Unknowns April 6,8
11	11/5/24	11/7/24	Lab 8 Spectrophotometric Determination of Aspirin
12	11/12/24	11/14/24	Lab 9 Determination of Acid Dissociation Constant Values for a Diprotic Acid
13	11/19/24	11/21/24	Lab 10 Determination of an Equilibrium constant for the acid dissociation of Bromothymol Blue.
14	11/26/24	11/28/24	THANKSGIVING WEEK (ThF)
15	12/3/24	12/5/24	MakeUp(6-10) & Check-Out(Turn In LabBooks)
			Individual Experiments
			All others in Pairs