

**LOYOLA UNIVERSITY CHICAGO, DEPARTMENT OF CHEMISTRY AND  
BIOCHEMISTRY  
CHEM 301 – Physical Chemistry I SYLLABUS, FALL 2024**

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**Course Information**

CHEM 301- Physical Chemistry I, Fall 2024

Lectures (Chem 301-001) (Tu Th 10.00AM – 11:15 AM, Flanner Hall 105)

Discussions (Chem 301-002) (Tu 11:30 AM – 12:20 PM, Flanner Hall 105)

Access to your LUC email and the course web page (Sakai). Check here often for general information, announcements, discussion forums, and grades.

**Pre-requisites**

CHEM 240 and 260 or CHEM 222 or CHEM 224; PHYS 112 or 122, and MATH 162, 263A or the equivalent

**Instructor Information**

Dr. Mausumi Mahapatra

Email: mmahapatra1@luc.edu

Office hours: Mon 10 AM-12 PM, FH 401 or by appointment

(Please contact me using the Loyola email system for course-related communications. Avoid using personal email accounts, I may not receive those emails due to spam filters.)

**Course Materials**

- Atkin's Physical Chemistry, 11th Edition, Oxford (ISBN 9780198817895). The 11th edition of Atkin's Physical Chemistry is the current one. If you find a previous edition (9th or later) that will be fine. You can find the book on the campus bookstore. Please contact me if you have any concerns about the textbook
- A scientific calculator for doing logarithms, scientific notation, and basic arithmetic.

**Learning**

- Learning Outcome: The objective of this course is to provide you with a solid understanding of the fundamentals behind the properties and behavior of macroscopic systems. Thermodynamics, which studies how systems behave at or near equilibrium, is widely used in chemistry to quantify the energetics of chemical systems. The major learning outcomes are for students to grasp both the mathematical and physical aspects of chemical system behavior, including classical and statistical thermodynamics, as well as the properties of matter.
- Course Structure: There are two 75-minute in-person lectures (Tu, Th) that will cover the detailed course materials. We also have a 50-minute discussion section on Tuesday after the lecture. The discussion section will be small group work. You will work in small groups (3-4 people) on assigned problems, to work with your classmates to learn the materials. As valuable as lectures and discussions may be, you will gain much more by completing assigned reading and problem sets before our meetings. By coming prepared, you can fill in any remaining gaps and ask questions to comprehend the material better. If you have any concerns/questions/feedback or need any additional help related to the class or course materials, please walk into the regular office hours. If you are unable to attend the regular office hours, I am happy to meet at a time that works for you.

- A tentative timeline for the course schedule is provided below. PLEASE NOTE THAT THE SCHEDULE IS APPROXIMATE WITH RESPECT TO COVERAGES; WE MAY GET BEHIND OR AHEAD AS THE SEMESTER PROGRESSES. The instructor reserves the right to make changes to the schedule. Any changes will be announced in class or on Sakai. Reading assignments are from the textbook Atkins 11<sup>th</sup> Ed. unless noted otherwise

CHEM 301 Course Schedule FALL 2024 (tentative)\*

Week	Dates	TUE	THU	Readings
1	8/27 8/29	Introduction	Perfect and real gases	Chapter 1 (1A, 1C)
2	9/3 9/5	Internal energy	First law	Chapter 2 (2A – 2B)
3	9/10 9/12	Enthalpy QUIZ 1	Thermochemistry	Chapter 2 (2C – 2E)
4	9/17 9/19	Entropy	Third law	Chapter 3 (3A-3B)
5	9/24 9/26	Maxwell relations QUIZ 2	<b>Midterm 1</b>	Chapter 3 (3C – 3D)
6	10/1 10/3	Free energy	Phase diagram	Chapter 4 (4A)
7	10/8 10/10	MIDSEMESTER BREAK no class	The phase rule	Chapter 4 (4A, 4B)
8	10/15 10/17	Phase transitions QUIZ 3	Thermodynamics of mixing	Chapter 4 (4B)
9	10/22 10/24	Liquids	<b>Midterm 2</b>	Chapter 5 (5A-B)
10	10/29 10/31	Solutions QUIZ 4	Colligative properties	Chapter 5 (5C-5F)
11	11/5 11/7	Activity	Phase diagram of binary mixtures	Chapter 5 (5C-5F)
12	11/12 11/14	Equilibria QUIZ 5	Equilibrium constants	Chapter 6 (6A-6B)
13	11/19 11/21	Le Chatelier's principle	<b>Midterm 3</b>	Chapter 6 (6A-6B)
14	11/26 11/28	Rate of Chemical reactions Quiz 6	THANKSGIVING HOLIDAY no class	Chapter 17 (17A-17D)

15	12/3 12/5	Integrated rate laws	Reaction mechanism	Chapter 17 (17A-17D)
FINAL WEEK		Take home final exam due on TUESDAY, 12/10		

## Exams

- **Midterm Exam:** There will be three midterm exams, tentatively scheduled for 9/26, 10/24 and 11/21 during class. I will drop the lowest score midterm. You may bring two-page notes to the exams. e.g., a formula sheet or some key notes which might help you to solve the problems.
- **Final Exam:** The Final Exam is a take-home and tentatively scheduled for 12/10. You will have 24 hours to complete the exam. You can use textbooks and class notes but don't take any help from online resources or experts.
- **Quizzes:** Approximately 6 quizzes will be scheduled throughout the semester. Tentative dates are included in the schedule above.

## Grading:

*You will be evaluated based on the following:*

1. quiz (approximately 6)	200 pts	(33%)
2. 3 midterm exams (100 pts each, lowest score dropped)	200 pts	(33%)
3. 1 final exam	200 pts	(33%)
<b>TOTAL ACHIEVABLE POINTS</b>	<b>600 pts</b>	<b>(100%)</b>

The following grading standards will be used (based on TOTAL points achieved):

<b>A</b> 92 % and up	<b>B +</b> 82 % – 86.99 %	<b>C+</b> 67% - 71.99 %	<b>D</b> 52 % – 56.99 %
<b>A –</b> 87 % – 91.99 %	<b>B</b> 76 % – 81.99 %	<b>C</b> 62 % – 66.99 %	<b>F</b> Less than 52 %
	<b>B –</b> 71 % – 75.99 %	<b>C –</b> 57 % – 61.99 %	

## 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. Regarding the use of Artificial Intelligence: our Provost has expressed to “Let us all make sure we are learning and sharing best practices and not allowing AI to do the learning for us.” 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. An 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 and will immediately result in a grade of F for the entire course.

## **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 or quiz due to emergency circumstances, please contact me as soon as possible so we can arrange a make-up date.** You may provide documentation for an absence, but it is not required.

## **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.

## **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](mailto: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.*

## 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](http://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](mailto: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](http://luc.edu/wellness).

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.

### Additional scheduling and dates information

- Academic Calendar: You are responsible for understanding all processes and timelines associated with dropping or withdrawing from this course, filing for a PASS/FAIL conversion, etc. The Loyola University Chicago academic calendar that lists important dates and deadlines for the semester can be found at: [www.luc.edu/academics/schedules](http://www.luc.edu/academics/schedules). The course withdraw deadline is Friday November 1 for Fall 2024
- Final Exam: The University sets the schedule for all final exams. The final will be due on:

***2 PM on 12/10/2024***

The final is a take home exam. You will be given the exam 24 hours prior to the due date. The exam will be posted on Sakai at 2 PM on 12/9/2024 and its due at 2 PM on 12/10/2024. Instructors may not reschedule final exams for a class for another day and/or time during the final exam period. There can be no divergence from the posted schedule of dates for final exams. Individual students who have four

(4) final examinations scheduled for the same date may request to have one of those exams rescheduled. If a student reports having four final examinations scheduled for the same date, students should be directed to e-mail a petition to Adam Patricoski, Assistant Dean for Student Academic Affairs, CAS Dean's Office ([apatricoski@luc.edu](mailto:apatricoski@luc.edu)).

- **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.

### **Department 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.

### **Copyright/Intellectual Property**

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.

### **Recording and 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.