

LOYOLA UNIVERSITY CHICAGO, DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY
CHEM 301 – Physical Chemistry I SYLLABUS, FALL 2023

Instructor: Dr. Mausumi Mahapatra
Lectures: (Tu Th 10.00AM – 11:15 AM, Flanner Hall 105)
Discussions: (Tu 11:30 AM – 12:20 PM, Flanner Hall 105)
Office Hours: Mon 10 AM-12 PM, FH 401 or by appointment
Web Page: sakai.luc.edu
Textbook: Physical Chemistry, by Atkins, *et al.* 11th Ed
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(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.)

PREREQUISITES

CHEM 222 or 224; PHYS 112 or 112K, and MATH 162 with a grade of C- or better.

COURSE DESCRIPTION

The objective of this course is for students to gain a firm understanding of the mathematical and physical aspects of the behavior of chemical systems, classical and statistical thermodynamics, chemical kinetics, and the properties of matter.

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. Please contact me if you have any concerns about the textbook
- A scientific calculator for doing logarithms, scientific notation, and basic arithmetic.
- **Access to your LUC email and the course web page** (Sakai). Check here often for general information, announcements, discussion forums, and grades.

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.

EXAMS

- **Midterm Exam:** There will be three midterm exams, tentatively scheduled for 10/5, 11/2, and 11/30 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 12/12. 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 10 quizzes will be scheduled throughout the semester. Tentative dates are included in the schedule below.

GRADING:

You will be evaluated based on the following:

1. quiz (approximately 10)	200 pts	(33%)
2. 3 midterm exams (100 pts each, lowest score dropped)	200 pts	(33%)
3. 1 final exam	200 pts	(33%)
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TOTAL ACHIEVABLE POINTS	600 pts	(100%)

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

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

LATE/MISSED WORK

- If you for any reason require special accommodations during any of the exams, contact me WELL BEFORE the exam. The day of the exam is too late.
- If you miss deadlines or exams for valid reasons (emergencies related to family, medical, legal, or immigration issues) you must contact me by email within 48 hours of the exam to avoid failing the exam.

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 <https://www.luc.edu/academics/schedules>.

CHEM 301 Course Schedule FALL 2023 (tentative)*

Week	Dates	TUE	THU	Readings
1	8/29 8/31	Introduction	Perfect and real gases	Chapter 1 (1A, 1C)
2	9/5 9/7	Internal energy QUIZ 1	First law	Chapter 2 (2A – 2B)
3	9/12 9/14	Enthalpy QUIZ 2	Thermochemistry	Chapter 2 (2C – 2E)
4	9/19 9/21	Entropy QUIZ 3	Third law	Chapter 3 (3A-3B)
5	9/26 9/28	Maxwell relations QUIZ 4	Free energy	Chapter 3 (3C – 3D)
6	10/3 10/5	Phase diagrams	Midterm 1	Chapter 4 (4A)
7	10/10 10/12	MIDSEMESTER BREAK no class	The phase rule	Chapter 4 (4A, 4B)
8	10/17 10/19	Phase transitions QUIZ 5	Thermodynamics of mixing	Chapter 4 (4B)
9	10/24 10/26	Liquids QUIZ 6	Solutions	Chapter 5 (5A-B)
10	10/31 11/2	Colligative properties	Midterm 2	Chapter 5 (5C-5F)
11	11/7 11/9	Activity QUIZ 7	Phase diagram of binary mixtures	Chapter 5 (5C-5F)
12	11/14 11/16	Equilibria QUIZ 8	Equilibrium constants	Chapter 6 (6A-6B)
13	11/21 11/23	Le Chatelier's principle QUIZ 9	THANKSGIVING HOLIDAY no class	Chapter 6 (6A-6B)
14	11/28 11/30	Rate of Chemical reactions	Midterm 3	Chapter 17 (17A-17D)
15	12/5 12/7	Integrated rate laws QUIZ 10	Reaction mechanism	Chapter 17 (17A-17D)
FINAL WEEK		FINAL EXAM TUESDAY, 12/12 take home (date and time subject to change)		

* 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 11th Ed. unless noted otherwise

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/cas/advising/academicintegritystatement/>

A basic mission of a university is to search for and to communicate the truth as it is honestly perceived. A genuine learning community cannot exist unless this demanding standard is a fundamental tenet of the intellectual life of the community. Students of Loyola University Chicago are expected to know, to respect, and to practice this standard of personal honesty. Academic dishonesty can take several forms, including, but not limited to cheating, plagiarism, copying another student's work, and submitting false documents. Any instance of dishonesty (including those detailed on the website provided above or in this syllabus) will immediately result in a grade of F for the entire course and will also be reported to The Chair of The Department of Chemistry & Biochemistry who will decide what the next steps may be.

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 (develop standard form on web) 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 as far in advance of the absence as possible. It is the responsibility of the student to make up any assignments. If the student misses an examination, the instructor is required to give the student the opportunity to take the examination at another time. (<https://www.luc.edu/athletheadvising/attendance.shtml>)

ACCOMMODATIONS FOR RELIGIOUS REASONS

If you have observances of religious holidays that will cause you to miss class or otherwise effect your performance in the class you must alert the instructor within 10 calendar days of the first class meeting of the semester to request special accommodations, which will be handled on a case by case basis who would like to review content that was presented.

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.

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). 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: <http://www.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.

STUDENT ACCOMODATIONS

The Student Accessibility Center (formerly known as Services for Students with Disabilities), Sullivan Center (773-508-3700), www.luc.edu/sswd, has the mission “to serve students with documented disabilities by creating and fostering an accessible learning environment,” including “supporting faculty, staff, and administrators on matters such as ADA and Section 504 compliance, as it relates to individuals with disabilities.” Please direct all questions concerning accommodations of disabilities to the Student Accessibility Center. Academic accommodations afforded to students require documentation and review. The Student Accessibility Center will issue accommodation letters for registered students to present to their instructors: accommodations are not active until students present these letters to their instructors. If students’ accommodations involve attendance or deadlines, instructors and students will jointly complete and execute an Agreement Form articulating their terms. 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.

YOUR WELL-BEING

If there are events occurring in your life that cause school to diminish in its priority, please discuss this with me or contact the Wellness Center (<http://www.luc.edu/wellness/index.shtml>) or the dean of students (http://www.luc.edu/studentlife/dean_of_students_office.shtml) for assistance. These are services that your tuition pays for and can be invaluable for your personal health and maintaining progress towards your degree. I am always willing to discuss how I can adapt the class and its materials so that you are successful