Chemistry 305: Physical Biochemistry for the Biological Sciences
Department of Chemistry & Biochemistry, Loyola University Chicago
Fall 2018

Instructor: Dr. Dan Killelea
Office: Flanner Hall 103
Phone: (773) 708-3136
Email: dkillelea@luc.edu

Office Hours: Tu, 9:30 – 10:30am in STEM Resource Center, CF 1st Floor, **or by appointment**
Lecture: 001: Tu Th 2:30 – 3:45 pm, Flanner Hall, Room 133 (auditorium)
Discussions: 002: Th, 10:00 – 10:50 am, Flanner Hall, Room 105
003: Th, 1:00 – 1:50 pm, Cudahy Hall, Room 315
Required Text: Physical Chemistry: Principles and Applications in Biological Sciences, 5th Ed., by Tinoco, Sauer, Wang, Puglisi, Harbison, and Rovnyak.
Online HW: Mastering Chemistry course ID is KILLELEA22287

Course Prerequisites: Chemistry 222 or 224/226 (Organic), Physics 112, and Math 132 or 162. If you have not completed the course prerequisites, you may be administratively dropped from the class. Please discuss this with the instructor immediately!

Please see the Sakai site for up-to-date information and posts.

Course Overview

Welcome to Physical Chemistry! The objectives of this course are for you to gain understanding of the fundamentals behind the properties and behavior of chemical systems. To achieve this, we will survey thermodynamics, quantum mechanics, chemical kinetics, and the application of some of these fundamental principles. Thermodynamics is the study of how systems behave at or near equilibrium, and is widely used in chemistry to quantify the energetics of chemical systems. Throughout the semester, we will explore how the concepts we are studying are relevant to the critical problems facing humanity as a whole. Of the great challenges facing our society, one of the most significant is one that chemists are well suited to solve, and that is the development of new energy sources. Quantum mechanics provides insight into the fundamental natures of matter and energy. Thermodynamics is key to understanding the obstacles in the quest for plentiful, clean fuels. The overarching goal of this course is for you, the student, to be adept at using the concepts covered in this course to critically gauge the accuracy and potential efficacy of political and scientific (!) solutions to problems that, in your lifetime, will only grow in significance.

Course Structure

There are two 75-minute lectures (T, R) and a single 50-minute discussion section per week. As valuable as lectures and discussion may be, you will gain much more by **completing** assigned reading and problem sets **BEFORE** the lecture. By coming prepared, you will be able to fill in any remaining gaps, and can *ask questions* to better comprehend the material. I cannot overstate how much more useful the classes will be if you come into the room well prepared, and even better, with questions for me and your fellow classmates. The three keys to success in physical chemistry are reading the text, solving as many problems as possible, and *asking questions!* Ask me questions about the material in class and office hours and ask your classmates questions.

As a courtesy to your classmates, please completely silence (not just vibrate mode) any audible devices you have with you before entering the classroom. The use of computers or whatnot during class is permitted, as long as it is silent, but is discouraged. Any audio or video recording (including streaming) during lectures or discussions is strictly forbidden; violations of this policy will negatively affect your grade. Repeated violations (at the discretion of the instructor) will result in a grade of zero on the next

test.

The discussion section will be small group work. You will work in small groups (3-4 people) on problems I provide as well as the assigned problems, with the goal of working with your classmates to learn the material.

Grading

Your grade will be determined on a basis of **600** points.

Tests (300 points): We will have four tests worth 100 points each. **The low test score will be dropped**. During the test, you may not use *any* electronic device (e.g. cell phones or computers) aside from a scientific calculator. If any banned device is observed, this will be construed as cheating.

Final Exam (200 points): The final exam will be cumulative and will be worth 200 points.

Homework (90 points): you will have weekly homework assignments to complement the material covered in class.

Evaluation (10 points): Successful completion (email the instructor) of the course evaluation is worth 10 points.

There will be no make-up homework, tests, or exams given under virtually any circumstance.

Final Exam: The College of Arts & Sciences schedules the final exam. The final will be held on:

Saturday, December 15, 2018 at 4:15 p.m.

in Flanner 133 (regular room). You will have exactly 2 hours to complete the exam. Additional time will not be granted, even if you arrive late. There will be no make-up final exams given under any circumstance, and the exam will not be given early, either.

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 Lester Manzano, Assistant Dean for Student Academic Affairs, CAS Dean's Office (lmanzan@luc.edu).

Grading Scale

There is a maximum of 600 points, letter grades will be assigned as given below:

	A: > 92%	A-: 92–88%
B+: 88–84%	B: 84–80%	B-: 80–76%
C+: 76–72%	C: 72–68%	C-: 68–64%
D: 64–50%	F: < 50%	

Supplementary Material

- Physical Chemistry: A Molecular Approach, by McQuarrie and Simon
- Physical Chemistry, 10th Ed., by Atkins and DePaula
- MIT Open Course Ware, Thermodynamics and Kinetics. (http://ocw.mit.edu/courses/chemistry/5-60-thermodynamics-kinetics-spring-2008/) Excellent note source with video lectures.
- Physical Chemistry, Harcourt Brace Jovanovich College Outline Series, by. J. Edmund White.

Please ask instructor if you want help finding supplementary materials.

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, that 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.

I have no tolerance whatsoever for cheating or plagiarism. ***Any*** *instance of dishonesty (including those detailed on the website provided above or in this syllabus) during a quiz, test, or exam will result in a* ***failing grade (F) for the course***. The Chair of The Department of Chemistry & Biochemistry will also be notified and will decide what the next steps may be. Please be honest with your work.

Teamwork: I strongly encourage you (the class) to work together to solve assigned and unassigned problems. In order to learn and excel in Physical Chemistry, you should work through problems. The assigned problems are a minimum. Work together with your classmates, if you do not understand something, someone else may. You will also find that explaining a solution to your classmate will cement the information in your mind, and make you a better student.

When working as a group, if <u>each</u> member contributes to the discussion, and you each hand in very similar work, that is perfectly acceptable given the nature of the assignments. On the other hand, if someone simply copies an assignment from someone else, that is plagiarism, and will be treated as such.

Loyola University Absence Policy for Students in Co-Curricular Activities

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/athleteadvising/attendance.shtml)

Students with Disabilities

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 Services for Students with Disabilities (SSWD), Sullivan Center, (773) 508-3700. Further information is available at http://www.luc.edu/sswd/.

Tutoring

The Loyola Undergraduate ACS has open tutoring every week on W and R evenings in Flanner 129. In addition, Loyola maintains a Center for Tutoring & Academic Excellence (http://www.luc.edu/tutoring/). Again, this is a service included in your tuition, so I encourage you to utilize their assistance.

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.

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.