

Chemistry 370/470
Biochemistry
Fall 2020

Instructor: Dali Liu, Professor of Biochemistry
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Lectures: 4:10 – 5:00 PM, MWF
Discussions: 2:50 -3:40 PM Friday

**The instructor reserves the right to make corrections and amends on this document.*

Online guidance:

All scheduled meetings including lectures, discussions and exams will be streaming real-time via Zoom. Lectures and discussions will be also recorded by the instructor and uploaded on Sakai. If necessary, extra lectures may be given as Panopto videos and uploaded on Sakai. Please make sure you have **Zoom** installed properly and monitor updates on **Sakai** frequently. You will need scanning/digital photographing capability to turn in your answers after exams via email.

Recording of Zoom 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 course has concluded. *Students will be required to turn on their cameras at the start of class. Students who have a need to participate via audio only must reach out to me to request audio participation only without the video camera enabled.* 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.

TENTATIVE SCHEDULE OF LECTURES: **All online lectures will be streaming via zoom.*

#	Day	Date	Subject	Chapters
1	M	8/24	Introduction of Biochemistry	1
2	W	8/26	Chemistry of Life Process	1
3	F	8/28	Protein Composition & Structure	2
4	M	8/31	Protein Composition & Structure	2
5	W	9/2	Protein Composition & Structure	2
6	F	9/4	Exploring Proteins	3
7	M	9/7	Labor Day	
8	W	9/9	Exploring Proteins	3
9	F	9/11	Flow of Genetic Information	4
10	M	9/14	Genetic Code	4
11	W	9/16	Exploring Genes	5
12	F	9/18	Exploring Genes	5
13	M	9/21	Test 1	1 – 5
14	W	9/23	Evolution & Bioinformatics	6
15	F	9/25	Hemoglobin	7
16	M	9/28	Hemoglobin	7
17	W	9/30	Enzymes: Basic Concepts & Kinetics	8
18	F	10/2	Enzymes: Basic Concepts & Kinetics	8
19	M	10/5	Enzymes: Basic Concepts & Kinetics	8
20	W	10/7	Enzymes: Catalytic Strategies	8
21	F	10/9	Enzymes: Catalytic Strategies	9
22	M	10/12	Regulation: Enzymes	10
23	W	10/14	Regulation: Enzymes	10
24	F	10/16	Regulation: Enzymes	10
25	M	10/19	Test 2	6 – 10
26	W	10/21	Carbohydrates	11
27	F	10/23	Lipids and Membranes	12
28	M	10/26	Lipids and Membranes	12
29	W	10/28	Channels and Pumps	13
30	F	10/30	Channels and Pumps	13
31	M	11/2	Signal Transduction	14
32	W	11/4	Signal Transduction	14
33	F	11/6	Signal Transduction	14
34	M	11/9	Test 3	11 – 14
35	W	11/11	Metabolism and Bioenergetics	15
36	F	11/13	Glycolysis and Gluconeogenesis	16
37	M	11/16	Glycolysis and Gluconeogenesis	16
38	W	11/18	Glycolysis and Gluconeogenesis	16
39	F	11/20	Citric Acid Cycle	17
40	M	11/23	Citric Acid Cycle	17
	W	11/25	Thanksgiving Break – no class	
	F	11/27	Thanksgiving Break – no class	
41	M	11/30	Oxidative Phosphorylation	18

42	W	12/2	Oxidative Phosphorylation	18
43	F	12/4	Oxidative Phosphorylation	18
	F	12/11	5:30 PM Final Examination	15-18 plus 1-15

Discussion Activities: **Attending the Zoom Discussion Sessions are mandatory, and they are critically beneficial to your class performance.*

The Discussion include the followings activities:

1. Comprehensive Reviews of the Lecture contents.
2. Study Tips & Problem Solving.
3. Scientific Thinking Exercises:
 - a. Experimental Design Practice
 - b. Developing scientific perspectives

The first Scientific Thinking Topic will be given in a discussion session as an example. The rest will be given as assignments. The topics will be selected later and **they will be included in the exams.*

Week	Dates	Activity
1	8/28	Amino Acids, Proteins & pH problems
2	9/4	Protein Structures
3	9/11	<i>Scientific Thinking Example: Express, purify and characterize recombinant proteins.</i>
4	9/18	DNAs and Review for Test 1
5	9/25	DNA, RNA, Evolution
6	10/2	Cooperativity and Enzyme Kinetics
7	10/9	Enzyme Catalysis & Regulation
8	10/16	Review for Test 2
9	10/23	Carbohydrates and Lipids
10	10/30	Signal Transduction
11	11/6	Review for Test 3
12	11/13	Prep for test 3 – You can attend both sessions.
13	11/20	Metabolism
	11/27	Thanksgivings
14	12/4	Review for Final

Pre-requisites: Organic Chemistry CHEM 222 or 224 and 226

Course Description: This is a one-semester Biochemistry course that emphasizes important biochemical concepts on the structure and function of proteins, enzymes, carbohydrates, lipids and cell membranes as well as on the bioenergetic and regulatory principles behind the central and carbohydrate pathways.

Outcome: Students will be able to demonstrate and understanding of structural-functional relationships in biological molecules and how carbohydrates are metabolized for energy needs.

Required Text: Berg, Tymoczko, Gatto and Stryer, *Biochemistry*, 9th Ed.

You should read the appropriate chapter **before** class. Please realize that I will not have time to lecture on every topic but will emphasize what I consider to be the most important topics. Obviously, these more important topics will be emphasized on examinations, but you are responsible for all of the text, lecture and discussion material.

Office Hours: Per-request, the instructor will stay online for as long as 1 hour after lecture, MW. If that doesn't work for you, please e-mail the instructor to set up an appointment for individual zoom meetings.

Grading Policy: There are **3 tests and a final examination** during the course. There will be 100 points possible on each test and 200 on the final. The final examination will be 50% on new material and 50% on the material covered in Tests 1 to 3. If one of the regular examinations is the lowest score, it will be dropped, and the final will count 200 points. If the final examination is the lowest score, then all four examinations will count 100 points each.

If you miss a test for any reason, then your final will automatically count 200 points. If you miss more than one test a make-up examination may be given at the instructor's discretion. Minimally, a written doctor's or judge's note and notification prior to the test (via phone or e-mail) will be needed for any missed test to be made up.

Grading Sale:

A	360 (90%)
A-	348 (87%)
B+	336 (84%)
B	320 (80%)
B-	308 (77%)
C+	296 (74%)
C	280 (70%)
C-	240 (60%)
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D	200 (50%)
F	below 200 (50%)

Any request to move up the letter grade because "it is close" will be declined.

Tests: The tests will be a mixture of multiple choice, problems and short essays. The students will be asked to sign on to provided Zoom session with both audio and video being turned on for proctoring purpose. In case of questions, a student can use “Chat” function to ask the instructor. The exam is “open” but required to be **independent**. Students will receive the exam 10 min before the exam. The answer will be scanned/photographed and sent to the instructor via email with in 10 min after the conclusion of the exam. You will receive a confirmation email upon your exam answers are received.

Final Examination: The University sets the schedule for all final exams. The final will be held on **Friday, 12/11 from 5:30 to 7:30**. You will have exactly 2 hours to complete the exam. Additional time will not be granted, even if you start late. There will be no make-up final exams given under any circumstance, and the exam will not be given early, either. 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. A student having four final examinations scheduled for the same date should to e-mail a petition to Adam Patricoski, Assistant Dean for Student Academic Affairs, CAS Dean’s Office (aptricoski@luc.edu).

*Online Time adjustments: Each exam will be emailed to students 5 min before the exam starts, and students will be given an extra 15 mins after the exam concluded to scan/photograph their answers to send back to the instructor via email.

Independent Effort: Students are referred to <http://www.luc.edu/media/lucedu/cas/pdfs/academicintegrity.pdf> for the CAS Statement on Academic Integrity. Students are advised to download and read the statement as it will be part of the governance of their efforts in the course. In addition, as pre-professional students at Loyola University Chicago, it should be obvious at this stage of your careers that all answers on examinations must arise from independent, honest efforts. Nothing less is acceptable in the Land of Lincoln. Thus, any student found cheating on any examination will receive an automatic "0" for that examination, which cannot be dropped. His (her) name will be reported to Prof. Ballicora, the Chairperson of the Chemistry and Biochemistry Department, as well as to the Dean of the College of Arts and Sciences, who will decide whether further disciplinary action is necessary. We remind you that such an incident will become part of one’s personal record and may be transmitted to organizations such as medical schools, dental schools, pharmacy programs, graduate programs, etc. Together, we encourage you to become the best that you can be and will work with you to achieve that goal.

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/>.

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/athletheadvising/attendance.shtml>)

Graduate Version of the Course: Chem 470 is the graduate version of this Biochemistry course. It requires students to learn additional skills not required for the undergraduate (Chem 370) course that will be helpful in their careers as professional biochemists and chemists. Special requirement for graduate students will be given as the course progresses.