



Instructor: Dr. Polina Pine, PhD ppine@luc.edu

TA: Gaby Martinez-Ramirez, gmartinezramirez@luc.edu

Synchronous meetings: Wednesday 9:30-10:20 am

M/F are asynchronous (Panopto lectures) (except for the first Monday)

Discussions: Thursdays as Scheduled on Locus

Office hour: Will be announced through Sakai

Prerequisite:

Essential: very strong knowledge of CHEM 222 or 224, very strong fundamentals of General Chemistry.

Course overview

Course surveys biomolecules and processes found in living organisms. Content includes structures of amino acids, lipids, and sugars and corresponding macromolecular structures, i.e., proteins, membranes, and polysaccharides as related to their biological functions. Topics discussed in classes include kinetics, mechanism of enzymatic reactions and the central metabolic pathways. Students who successfully complete this course will be able to do the following, at an acceptable level (including but not limited to): Identify and describe biomolecules including carbohydrates, amino acids/proteins and lipids/lipid bilayers. Choose appropriate buffer system; calculate the ratios of weak acid to conjugate base; determine the pKa from the associated titration curve; Show the major form of an amino acid/polypeptide including the zwitterion, at different pH values; track the fate of an oxygen molecule from inhalation in the lungs, track the fate of a carbon dioxide molecule produced from the TCA cycle, identify the kinetics of an enzymatic process; identify the substrates, enzymes and products in both catabolic and anabolic metabolism; track the fate of pyruvate and acetyl-CoA through the TCA cycle; track the fate and path of high-energy electrons through the electron transport complexes/respiratory chain, in conjunction with the Chemiosmotic principle of proton translocation utilized in oxidative phosphorylation to synthesize ATP, calculate the number of cycles of beta-oxidation of various fatty acids, track the synthesis of fatty acids; recognize catabolism and anabolism of amino acids.

Textbook and material:

All material including videos, tutorials, exam problems, etc. of this class is copyrighted and cannot be shared outside of this class.

The class material structure/videos/Zoom sessions will be the most critical source of information for this course:

1. **Required:** Windows or Mac computer (**will not be** compatible: Chromebook, iPad, any other devices)
2. **Required:** Webcam (external or built-in in the device), earphones, microphone.
3. **Required:** any scanning app (free good Apps: Built-in Notes App in iPhones, free apps: CamScanner, Genius Scanner etc.)
4. **Required format of all handwritten submissions is PDF! Other files/formats will not be accepted.**
5. **Required:** Stable internet
6. Smartphone or any mobile device with working camera (please let Dr. Pine know during the first week of classes if this is an obstacle).
7. **Required:** Reduced noise environment or room. For the exams/quizzes student required to arrange him/her/them-self a room in which they are not interrupted and no other people, but a student are present.
8. **Required:** Sakai, Zoom and Panopto access associated with Loyola UVID (access given automatically if enrolled to a course). It is student's responsibility to check all announcements on Sakai/email and follow them.
9. **Required: Wide ruled** composition notebook (25 lines per page ONLY). Any other ruled notebooks will not be read by the homework system and as a result will be graded as Zero.
10. **Required:** WileyPlus account. The homework will be assigned on WileyPlus. The registration flyer with the access code will be posted under Resources on Sakai.
11. **Required Textbook:** Biochemistry: An Integrative Approach with expanded topics, 1st Edition, John Tansey.
12. WileyPlus for the above text (see flyer on Sakai)

Not all textbook sections will be fully covered or covered in the order the textbook dictates, so focus first on the material that is directly covered in a course structure, lecture, WileyPlus and assigned for homework. *See Tentative Lecture Schedule that will be posted on Sakai during the first week of classes.. Students are expected to read related material from any textbook before and after each lecture.*

The material covered in this class is mentioned in several textbooks. The additional reference texts are listed below. The recommended texts are given in the order of the priority.

Not required but recommended Reference textbooks:

- a) Dean R. Appling, Spencer J. Anthony-Cahill, Christopher K. Mathews, *Biochemistry: Concepts and Connections*; Pearson (2nd or 1st edition)
- b) Biochemistry, Campbell/ Farrell/ McDougal, 9th ed. (or earlier ed.), Brooks-Cole, Cengage Learning, 2018
- c) Pratt, Cornely, *Essential Biochemistry*, Wiley ISBN: 978-1-119-31933-7 (or any earlier edition)

Course Topics **Our actual pace and the topics may vary from the schedule:**

Please see Sakai and Panopto Modules' videos for the exact flow of the topics:

1. Chemical Foundations of Biochemistry

2. Amino Acids/Proteins
3. Protein Purification and Sequencing
4. Enzymes: kinetics of biochemical reactions
5. Enzymes: Allostericity, Additional regulation
6. Lipids: structure, properties, and function (including selected topics such as membranes, signaling)
7. Energy metabolism (Biochemical Thermodynamics)
8. Sugars: structures and functions
9. Glycolysis/ Gluconeogenesis (including regulation)
10. Pyruvate Dehydrogenase Complex (including regulation)
11. Citric Acid Cycle (including regulation)
12. Electron Transport Chain, Oxidative Phosphorylation
13. Shuttle Mechanisms and Anaplerotic Reactions
14. Lipid Metabolism (what time allows)
15. Nitrogen Metabolism (what time allows)
16. Integration of Metabolism

Reference chapters from the Biochemistry, Campbell/Farrell/McDougal, 9th ed: 2,3,4,5,6,7,8,15, 16,17,19,20,18,21,23, 24 (embedded in other chapters/topics).

Interaction with the professor and the classmates:

- Only positive, respectful behavior is tolerated in this class. Please see **Harassment (Bias)** section at the end of the document. If any not respectful behavior of any student towards other students or instructors is observed, it will be reported. Please keep all interaction respectful and professional.
- To contact Dr. Pine during the fall semester starting August 24th by email put **CHEM361-YOURSECTION in the Subject field**. If email is sent without this specific subject it may be sent to a SPAM folder and/or overlooked. If your email has not been answered over email during the business days over 48 hours or in a Zoom session it might be sent to spam. Please resend it. I will be happy to answer any questions or emails during official business hours.
- All emails will be answered within 24 hours window during business days. No email interaction aside the business hours. Emails are not answered during weekends and holidays.

Structure of the class:

- The course content is broken into modules by topics/chapters and into weeks by pace: Week 1 through Week 16.
- Homework will be in the form of WileyPlus every week and will be due each Monday by 11:59pm except for the week after the exam. The WileyPlus assignment will be posted by Thursday at latest (before the Monday it is due). Students must supplement this mandatory homework with the end of chapter odd problems (solution for these problems is given in the back of the textbook).
- Any additional material if assigned will be posted on Sakai. If posted on Sakai students must follow all the directions given in the handout.

- All Lectures are asynchronous and will be pre-recorded and posted on Panopto following predefined schedule. There will be also synchronous sessions every Wednesday during the lecture time. Please follow the explanation in the first class on Monday and Sakai announcements regarding the format of these sessions.
- No specific problem-solving questions will be answered via email. All such questions should be asked during Wednesday synchronous sessions and during Discussions.
- Students must collect questions related to the material and ask them during Wednesday synchronous meeting or during the Discussion.
- Use specific, separate notebook or notetaking app to keep track of the questions that rise.
- Watching Panopto Videos supplemented by textbook reading is MANDATORY and is incorporated in the overall grade. The watching activity on Panopto MUST follow the schedule that will be posted on Sakai.
- Make-up assignments are not available for this course. However, if ONE exam is missed due to a serious illness different grading scale may be implemented if a documented evidence is presented within one week of the missed exam. Other missed assignments will **not** give an opportunity for re-take or make up. **For success in this course, it is important to stay in a planned pace, review your notes, watch videos, read the textbook, work on homework problems if assigned and work on memorization every day.** DO NOT FALL BEHIND. There will be a big portion of memorization material in this class.

EXAMS:

- **All Exams are closed book, closed notes, closed Internet, closed WileyPlus. Absolutely no help on the exams may be accepted or given. Absolutely no material may be used except for calculator, scratch paper, pencil, eraser. Students will be expected to follow the policies of Academic Integrity and will be required to sign Honor Pledge of academic honesty. If any violation or any unauthorized internet activity is detected it will be reported and automatic F-grade will be assigned for the class. See Academic Dishonesty Statement given below.**
- There are three 40 minutes-unit exams and one final exam (additional 10 minutes on the unit-exams that do not exceed 50 minutes scheduled slot may be granted for all students to encounter for technical problems such as frozen browser, unexpected internet problems, other unexpected issues if student prepared for the exam and follows all the announcements and policies).
- The exams are timed and proctored. Please prepare to take the exam ahead of time. You may not leave a room or/and a computer during the exam before finished.
- Please prepare and use during the Exams (calculator is allowed in the Exam 1 ONLY), blank paper sheets for calculations and scratch, pencils, and erasers. The format of each exam will be announced on Tuesday before each exam (or a day before each exam). No personal email about the format of the exam may be answered. These questions may be answered during group-zoom session only.
- Respondus LockDown browser may be utilized during the exam. Please pre-install it on your PC/MAC.
- **The Exams are scheduled on the following weeks (MAKE SURE TO ALLOCATE THIS TIME SLOTS FOR YOUR EXAM, OPTIONAL PERSONAL TIMES/DATES ARE NOT POSSIBLE):**

- I. Unit Exam-1 (40 minutes) on Wednesday of a Week-4 (During Scheduled Lecture time ONLY) **September 16**
- II. Unit Exam-2 (40-minute) on Wednesday of a Week-8 (During Scheduled Lecture time ONLY) **October 14**
- III. Unit Exam-3 (40-minute) on Wednesday of a Week-12 (During Scheduled Lecture time ONLY) **November 11**
- IV. Final Exam on Saturday of Week-16 (starts at 1pm) **December 12** as scheduled on official Loyola calendar <http://luc.edu/academics/schedules/index.shtml>

- Exams may be proctored using a ZOOM or a software that utilizing web camera and tracking all internet traffic and usage of a computer during the proctored exam only. More details will be given on Tuesday before each exam, but student MUST have all the required material from the list above ready and working.
- **Students must read carefully (it is student's responsibility to read and know) all directions related to the exam procedure given in the Syllabus or sent before the exam. Not following the direction, not reading the directions, missing the direction will not be tolerated.**
- There are NO EXTRA ASSIGNMENTS NO MAKE-UP EXAMS OR QUIZZES. Under no circumstances may an exam/quiz/assignment be taken at a time and date other than that assigned.
- Issues with graded exams must be submitted within one calendar day of being returned, otherwise scores will be considered final.
- **All exams must be taken during the scheduled time only!** Final exam is MANDATORY. The final exam must be taken ONLY on the date scheduled or a grade of F will automatically result. The final exam is not planned to be cumulative, however due to the nature of the material the questions/problems may incorporate any topic covered during the semester, hence the final exam is comprehensive. The final details about the final exam will be given at the end of the semester.
- **A link to the official Loyola calendar can be found here:**
<http://luc.edu/academics/schedules/index.shtml>

It is student's responsibility to follow the announcements, and all policies or changes of the class

Instructor Privileges

Instructor reserves the right to make changes and adjustments to this syllabus as necessary, including, but not limited to the grading policy and course schedule.

Grading policy:

Under no circumstances may any exam be taken at a time and date other than that assigned.

However, to encounter for unexpected illnesses the alternative grading scale will be used (please see details below)

The midterm and final letter grades will be given based on the points scored in the course only, please do not contact for personal extra-credit favors. Final grade will be determined using the table below. **IMPORTANT: NO MAKE UP OR LATE EXAMS, NO MAKE UP OR LATE SUBMISSIONS** of any type. No early or late exams, no make-ups. However, to accommodate *students' personal circumstances (sickness, job schedules, family circumstances, unstable internet connection, technology issues, clinical shifts, etc.) one and ONLY one unit exam may be dropped, final exam MUST be taken (cannot be*

dropped). The optional grading scale may be implemented please see instructions below. If you miss one-unit exam for any reason above, please send Dr. Pine the documented evidence within 1 day before/after the scheduled exam, this exam cannot be taken in a different time or different day BUT this missed exam will be dropped, and Option 2 will be used to determine your grade. If a student follows ALL the polices of the class and watches all the videos on Panopto, did not miss any exam, but scores unsatisfactory on one of the unit exams this student is eligible for calculation of the final grade using either of the options below whichever grants a higher final grade. In addition, if one and only one WileyPlus assignments is not completed for one of the reasons above it may be dropped at the end of the semester. **Instructor reserves the right to make changes and adjustments to this syllabus as necessary, including, but not limited to the grading policy and course schedule.**

Option 1		Option 2	
WileyPlus	10%	<i>Lower unit-exam score is a drop</i>	
Participation/Panopto/activities/quizzes	10%	WileyPlus	10%
Unit Exam 1	20%	Participation/Panopto/activities/quizzes	10%
Unit Exam 2	20%	Unit Exam best out of three	25%
Unit Exam 3	20%	Unit Exam second best out of three	25%
Final Exam	20%	Final Exam	30%
Total	100%	Total	100%

Participation will be based on your involvement in videos on Panopto, Forum participation, Class Polls, Discussions and Synchronous meeting participation. For example, if all uploaded videos are watched fully (100% time) with Panopto app/browser open (NOT on the background) and student is present and watching videos it will grant major part of the credit points. You may watch the videos on any speed. ALL exam points, quiz, homework, participation points and any other points scored in this class are converted first to percentages and then incorporated to the final grade calculation (weighting) given in the table above. The final score will be rounded to 2 sig. figs. Letter grades assigned based on the table below.

All graded assignments including the exams: Only mistakes such as tallying up points by the system are eligible for regrading, students typos, overlooking the directions, not following the directions, and other mistakes and other circumstances are not eligible for any type of regrading. For this reason, please carefully read all the directions and ask the professor if anything remains unclear. No requests for partial credit or any type of extra credit may be accommodated.

Approximate grading scale (letter grade is related to percentage scored in the class):

A	A-	B+	B	B-	C+	C	C-	D+	D	F
100-95	94-90	89-85	84-80	79-75	74-70	69-65	64-60	59-55	54-50	less than 50

Please note: that materials from this course (INCLUDING PROBLEM SETS, EXAM and DISCUSSION PROBLEMS/QUESTION) cannot be shared outside the course without the instructor's written permission (as reminded by the CAS Dean's Office memo, Jan. 2020). All material in this class is copyrighted.

Please note that all materials from this course are copy righted! No material including any exam problems/questions/solutions can be shared outside the course without the instructor's written permission.

Academic Integrity

Trust and integrity are important qualities in students. All submitted work must represent your own work and your own work only. Academic dishonesty of any kind, such as plagiarism and cheat sheets on exams, will not be tolerated. Any student caught cheating on an assignment in any way will receive a "zero" for that assignment and be reported to Chairperson of the Chemistry Department and the Dean School of Art and Science. For further information regarding the Academic Integrity policy and disciplinary procedures, refer to the Undergraduate Studies Catalog: http://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml.

Academic Dishonesty includes such infractions as:

- **Obtaining a copy of tests or scoring devices**
- **Using another student's answers during an examination**
- **Providing another student questions or answers to or copies of examination questions**
- **Having another person impersonate the student to assist the student academically**
- **Impersonating another student to assist the student academically**
- **Representing as one's own work the product of someone else's creativity**
- **Using, or having available for use, notes or other unpermitted materials during "closed book" examinations**
- **Duplicating any portion of another student's homework, paper, project, laboratory report, take-home examination, electronic file or application for submission as accepting a copy of tests or scoring devices**
- **Having someone other than the student prepares any portion of the student's homework, paper, project, laboratory report, take-home examination, electronic file or application, other than for a teacher-approved collaborative effort.**
- **Permitting another student to copy any portion of another student's homework, paper, project, laboratory report, take-home examination, electronic file or application other than for a teacher-approved collaborative effort**
- **Using any portion of copyrighted or published material, including but not limited to electronic or print media, without crediting the source**
- **Any other action intended to obtain credit for work that is not one's own.**

Students seeking Special Accommodations (SAC)

If you have any special needs, please send me an official letter from the Student Accessibility Center SAC 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/>.

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.

Tutoring Center

The CTAE offers several different programs each semester, including class-specific tutor-led small groups, Academic Coaching groups dedicated to general academic support, and a Study Buddy Directory for students seeking out more independent collaboration with other students in the same class or subject area. For more information refer to http://www.luc.edu/tutoring/Small_Group_Info.shtml

Harassment (Bias Reporting)

It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. The university qualifies these incidents as incidents of bias. In order to uphold our mission of being Chicago's Jesuit Catholic University-- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice and faith, any incident(s) of bias must be reported and appropriately addressed. Therefore, the Bias Response (BR) Team was created to assist members of the Loyola University Chicago community in bringing incidents of bias to the attention of the university. If you believe you are subject to such bias, you should notify the Bias Response Team at this link: <http://webapps.luc.edu/biasreporting>

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.

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) 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 make up examination at another time that fits the class schedule and requirements (<https://www.luc.edu/athletheadvising/attendance.shtml>)