



**Teaching Team:**

Professor: Dr. Polina Pine, PhD [ppine@luc.edu](mailto:ppine@luc.edu)

Synchronous meetings: Mondays 9:00am-10:00 am

Other mandatory times: other days are asynchronous (Panopto lectures other work). However, students MUST be available during M, W and F lecture times.

Office hours: Fridays 9:00am-10:00 am

**Prerequisite:**

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

**Course overview**

Prerequisite: CHEM 221 or 223. This is the first part of a two-semester Biochemistry series 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 an understanding of structural-functional relationships in biological molecules and how carbohydrates are metabolized.

Topics discussed in classes include kinetics, mechanism of enzymatic reactions and the central metabolic pathways of carbohydrates. 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.

The link to the evaluation of the course will be sent to students at the end of the term. Please find 2-3 minutes to fill this online survey. Please remember that as the evaluation manual states: “..As student raters, you should also know that the results of your ratings for this class will be included as part of the information used to make decisions about promotion/tenure/salary increases for this instructor. Fairness to both the individual and the institution require accurate and honest answers.”

## 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  
Required and approved OS: Any of the following: Windows: 10 (Includes x86 32 and 64bit processors and ARM 64bit processors using x86 emulation)). Windows 10S is not a compatible operating system. Mac: macOS 10.12 to 10.15 (**will not be** compatible: Chromebook, iPad, Android devices and any other devices). Note: You must contact the IT if you have any software or hardware difficulty.
2. **Required:** Webcam (external or built-in in the device), earphones, microphone.
3. **Required:** Scientific Calculator. NOT ALLOWED: calculators in a phone, tablet, computer, or in any other device.
4. **Required:** any scanning app (free good Apps: Built-in Notes App in iPhones, free apps: CamScanner, Genius Scanner etc.).
5. **Required:** Respondus LockDown Browser installed on your computer  
[https://www.luc.edu/its/itrs/itsacademiccontinuityresources/Respondus LockDown Browser | Sakai 20 Student Guide | Loyola Support Documentation \(screenstepslive.com\)](https://www.luc.edu/its/itrs/itsacademiccontinuityresources/Respondus%20LockDown%20Browser%20Sakai%20Student%20Guide%20Loyola%20Support%20Documentation%20(screensteps%20live.com))  
<https://luc.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=04f4e927-11ee-474b-acab-ab8b013172de>
6. **Required format of all handwritten submissions if assigned is PDF! Other files/formats will not be accepted.**
7. **Required:** Stable internet
8. **Required:** Smartphone or any mobile device with working camera and Zoom.
9. **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.
10. **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.**
11. **Required:** Access to printer. Some assignments/exams may require submission of a handwritten portion on a special form. This form will be posted on Sakai at least two days before the submission date. Students must print this form and follow the instructions sent through the announcement or given in the assignment/exam. Submissions in any other format may not be accepted.
12. **Required:** WileyPlus account. The homework will be assigned on WileyPlus. The registration flyer with the access code will be posted under Resources on Sakai.
13. **Required Textbook:** Biochemistry: An Integrative Approach with expanded topics, 1st Edition, John Tansey

14. **Required** WileyPlus for the above text (see flyer on Sakai)
15. Some assignments may utilize other internet or electronic platforms free of charge for students (i.e. [Gradescope.com](https://www.gradscope.com)).

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 (2<sup>nd</sup> or 1<sup>st</sup> 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. Glycogen metabolism and integration of metabolism

Example of reference chapters from an optional not required textbook 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.

- **Any specific questions regarding problem solving, lecture clarifications may not be answered over email. Please utilize peer forum and our zoom meetings.**
- Students are expected to interact, ask each other, and answer questions in the Forum on Sakai. This activity is recorded, graded, and is included in the final grade (please see the Grading Scale for details).
- **To contact Dr. Pine during the semester by email put **CHEM361-YOUR SECTION** in the Subject field or use email tool on Sakai.** 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 48 hours during the business days or in a Zoom session do the following:
  1. Check if you sent it with **CHEM361-YOUR SECTION** in the subject field (if not, please resend following the proper format and proper subject).
  2. If the format is correct and it was not answered in Zoom, please resend it.
- All emails will be answered within 24-48 hours window during business days. **No email interaction aside the business hours. Emails are not answered during weekends, breaks, and holidays and evenings.**

#### Structure of the class:

- The course content is broken into modules by topics/chapters and into weeks by pace: Week 1 through Week 6.
- Homework will be in the form of WileyPlus every week and will be due every Sunday by 11:59pm (except for week 6- due last Thursday at 11:59pm). The WileyPlus assignment will be posted by Monday afternoon about 6 days before 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).
- The last due date of the last submission of any type of the Summer 2021 semester is last Thursday of the semester at 11:59pm .
- Any additional material if assigned will be posted on Sakai. If posted on Sakai students must follow all the directions given in the handout.
- The whole structure of the class Lecture/Discussion follows flipped format in which all Lectures are asynchronous and will be pre-recorded and posted on Panopto following predefined schedule. There will be also synchronous mandatory interactive sessions during the lecture times given in the schedule, which will include problem-solving demonstrations, activities, additional material presentations, or clarifications, student's participation and more. Students are expected to participate in these sessions. Please follow the explanation in the first class on Monday and Sakai announcements regarding the format of these sessions. If a student cannot attend a session for any reason the student **MUST** watch the recording (this activity is monitored). If any question regarding this session appears please ask your peers in the forum for clarification.
- If a student did not attend a session, a student **MUST** watch the recording prior to asking any questions.

- No specific problem-solving questions will be answered via email. All such questions should be asked during office hours, and synchronous sessions.
- Office hours, sessions and meetings will follow the predefined schedule. For example, if the schedule indicates Module 1 and 2 the sessions will be focused to the material of these modules and not previous or next module.
- Sakai Forum is designed to connect students together and accelerate peer-to-peer support. Forum will be graded weekly.
- Students must collect questions related to the material and ask them during synchronous meetings, office hours and peer-to-peer Forum.
- Use specific, separate notebook or notetaking app to keep track of the questions that rise to ask them during the session.
- Watching Panopto Videos following the scheduled and supplemented by textbook reading is MANDATORY and the material, exams and assignments will focus primarily on these videos but is not limited to the videos, additional general scientific journals reading, critical thinking and background knowledge are essential.
- **Make-ups, retakes, alternative dates and times are not available in this course for any reason.**
- **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 but if you have a strong knowledge of prerequisites the memorization will turn into critical thinking.
- Use Zoom-Pro link in Sakai sidebar or links provided to access Zoom meetings.

#### 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 50 minutes exams (additional 10 minutes on the exams that do not exceed 60 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 and only if a 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 following items only:  
scientific calculator, blank paper sheets for calculations and scratch, pencils, and erasers.  
The format of each exam will be announced on Friday 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. Please utilize Forum if you have any questions.
- 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 (50 minutes) on Monday of a Week-3 (9:00 am start time ONLY) June 7
  - II. Unit Exam-2 (50-minute) on Monday of a Week-5 (9:00 am start time ONLY) June 21
  - III. Final Exam on Friday of Week-6 (starts at 9:00 am ONLY) July 2
- 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 Friday 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>
- June 25<sup>th</sup> Summer Session A (First 6-Week Session):  
Last day to withdraw from session without a penalty grade of "WF"; midnight

**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:**

#### **Online COVID-19 Class Policies Statement:**

Due to uncertain times we all found ourselves the policies of this class were modified to consider possible obstacles and include all possible flexibility with the due dates and exam formats. In addition, to minimize the uncomfortable online environment for some students, this class was designed to consider possible technology and personal difficulties. All these modifications are expressed in this document and the Class Schedule on Sakai.

**Under no circumstances may an exam be taken at a time and date other than that assigned.** In the case of catastrophic even such as serious illness, death of a family member, car incident, jury duty, etc. different calculation of a final grade may be applied putting heavier weight on a more cumulative exam

if and only if an official documented evidence is provided within 24 hours of the missed exam. Please make sure not to plan any flights, trips, serious events etc, before the exams (three dates ONLY) as it will not grant above eligibility.

The midterm and final letter grades will be given based on the points scored in the course only. Final grade will be determined from the following:

WileyPlus	15%
Forum/Participation	10%
Unit Exam 1	20%
Unit Exam 2	20%
Final Exam	35%
Total	100%

### Forum Grading:

Forum is graded weekly. There are two options only for Forum grading 0 and 1. A student is required to post at least three times a week in the forum, each post will grant 1 point per post (maximum 3 points per week, posting more than 3 times is encouraged but will not grant additional points). Additional Forum activities if assigned will be announced through Sakai/Announcements or Sakai/Forum and will grant additional participation points. At the end of the semester these points are converted to the percentages and weighted into overall score.

*Extra-credit Forum Participation: 5 most active Forum participants will be given 5% points added on top of the Sakai Forum + Other participation percentage before weighting into the overall score of the class: Example: A student scored 97% on the Sakai Forum+ Other participation points. This student was one of the most active Forum participants (posting/answering). Sakai Forum + Other participation SCORE of this student will be  $97\%+5\%=102\%$  It will be incorporated in the final grade as  $102*0.1$ +rest of the components.*

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 formats, and other mistakes and other circumstances are not eligible for any type of regrading. For this reason, please read carefully all the directions and ask the professor if anything remains unclear.

**No personal, alternative, students proposed grading scales and requests or 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

### 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, contact [SAC@luc.edu](mailto:SAC@luc.edu). Further information is available at <http://www.luc.edu/sac/>.

**Exams times for students with documented time extension (SAC):**

All students with the documented time extension will start the exams at 9am. Please follow details sent in a general announcement before each exam.

**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. No photos/screen shots, video sharing of any part of the exam. 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](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.**

### **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](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. 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>)

**Accommodations for Religious Reasons**

If you have observances of religious holidays that will cause you to miss class or otherwise affect 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.