



*Instructor: Dr. Polina Pine*

Email: ppine@luc.edu

Synchronous Sessions: Mondays 10:30am-11:30am

Fridays before the exams 10:30-11:30 am

Online See Locus/Sakai for details

Contacting: Please feel free to send emails with the brief questions. Emails will be answered within 24 hours during business days and within 48 hours if email is sent after 4pm on Friday or on Saturday/Sunday. Usually emails are not answered during weekends, after 5pm during business days and after 4pm on Fridays.

### Prerequisite:

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 (please follow the explanation given during the first Synchronous Lecture):

**All material 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:**

The material covered in this class is mentioned in several textbooks. The main reference texts are listed below. The recommended texts are given in the order of the priority. More details will be given during the first session of the semester.

1. **Required:** Windows or Mac computer (**will not be** compatible: Chromebook, iPad, any other devices or PC)
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, CamScanner, Genius Scanner etc.)
4. **Required:** Stable internet
5. **Required:** Smartphone or any mobile device
6. **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.
7. **Required:** Sakai access: all communication will go through Sakai and Zoom synchronous sessions. **It is student's responsibility to follow the announcements, and all policies of the class. If you miss a Zoom session for any reason, first watch zoom recorded session posted on Panopto and only then send an email.**
8. **Required:** Sakai, Zoom and Panopto access associated with Loyola UVID (access given automatically if enrolled to a course).
9. Students may be asked to get TopHat access code [www.tophat.com](http://www.tophat.com) (...do not purchase it unless is mentioned by Dr. Pine in a separate announcement):
10. **Required:** Wide ruled composition notebook.
11. **Required:** WileyPlus account. The homework will be assigned on WileyPlus. Students enrolled in Dr. Pine's Biochemistry class this summer are getting FREE access to both the WileyPlus and the associated e-text (by Tansey) given below. Please follow the registration flyer with the FREE access code posted under Resources on Sakai.
12. **Recommend but NOT required:** Any digital ink device: such as iPad with Apple Pencil, Surface Pro with any pen, android Tablet with pen, etc. This course was designed in such a way that lack of these devices will not affect the performance in the class.
13. **Required Textbook:** Biochemistry: An Integrative Approach, 1st Edition, John Tansey. Wiley ISBN: ES8-1-119-32150-7.
14. *Reference textbook (NOT required):* Biochemistry, Campbell/ Farrell/ McDougal, 9th ed. (or earlier ed.), Brooks-Cole, Cengage Learning, 2018  
*Supplementary textbooks for the class include (NOT required):*
  - a) Pratt, Cornely, *Essential Biochemistry*, Wiley ISBN: 978-1-119-31933-7 (or any earlier edition)
  - b) 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)

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

Please see WileyPlus 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. Pentose Phosphate Pathway (if time allows)
15. Lipid Metabolism (what time allows)
16. Nitrogen Metabolism (what time allows)
17. Integration of Metabolism

Reference chapters from the Biochemistry, Campbell/Farrell/McDougal, 9th ed to be covered: 2,3,4,5,6,7,8,15, 16,17,19,20,18,21,23, 24 (embedded in other chapters/topics). 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 posted on Sakai under Recourses. Students are expected to read related material from any textbook before and after each lecture.*

#### Learning procedure:

- Only positive, respectful behavior is tolerated in this class. Please see **Harassment (Bias)** section at the end of the Syllabus. If any not respectful behavior of any student towards other students or instructors is observed, it will be reported.
- To contact Dr. Pine 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.
- **It is student's responsibility to follow the announcements, and all policies of the class.**
- Make-up assignments, exams, quizzes are not available for this course. However, if one of the unit-exams is missed due to serious sickness of the student, different grading weighting system may be used (generally putting higher weight on the Final Exam). To be eligible student must present documented evidence of the sickness within one week of the missed exam, missing more than one-unit exam will result in zero score for both exams. Final exam must be taken; the date and the time of the exam are **not** negotiable.

#### 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 due weekly on Sundays at 11:59pm, except for the week before the exam. The week before the exam the homework is due on Fridays at 11:59pm.
- Any additional material if assigned will be posted on Sakai. If posted on Sakai students must follow all directions given in the handout.

- One-hour non-mandatory weekly synchronous sessions are scheduled on Monday mornings (see first page for time). These sessions will be held through ZOOM, will be recorded, and posted on Panopto for all students enrolled in Dr. Pine's sections of Summer 2020. By participation in a Zoom session you automatically giving a consent of recording the session and posting it on Panopto for participants of both CHEM361-001 and CHEM361-002 session. In case you disagree with this policy you may opt out participation and watch the recording on Panopto. **If you miss a Zoom session for any reason, you must watch a recording. If you have any questions but did not attend the Zoom session, first watch Zoom recorded session posted on Panopto and then send an email with questions if your question was not answered during the session. Best way to get all your questions answered is during synchronous Zoom sessions, not emails.**
- **Check-up assignments (CUPs assignments)** will be announced 24 hours prior to the submission deadline. No extensions for deadlines are available. The quizzes may be submitted in PDF format only and only to the platform indicated by the Instructor, no files may be submitted (sent) to email. **Check-up assignments (CUPs)** will be graded using <http://www.Gradescope.com> platform. The scores and the graded Pdf **CUPs** will be available to students on this platform within 5 business days.
- Watching Panopto Videos supplemented by textbook reading is MANDATORY and incorporated in the overall grade. The watching activity on Panopto MUST follow the schedule posted on Sakai otherwise it will not be counted as completed.
- **It is student responsibility to follow the policies in the Syllabus, Sakai and Announcements. Not following the policies or announcements may result in poor performance in class.**
- Make-up assignments are not available for this course. **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 every day. DO NOT FALL BEHIND.**

#### 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 two 60 minutes-unit exams and one final 120 minutes exam. The exams are timed and proctored. Please prepare to take an 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 a calculator, blank paper sheets for calculations and scratch, pencils, and erasers. The format of each exam will be announced on Friday before each exam. No personal email about the format of the exam may be answered. This questions may be answered during zoom session only.
- The Exams are scheduled on the following weeks (MAKE SURE TO ALLOCATE THIS TIME SLOTS FOR YOUR EXAM):
  - I. Exam-1 (60 minutes) on Monday of a Week-3 (10:00-11:00am) June 1**

**II. Exam-2 (60-minute) on Monday of a Week-5 (10:00-11:00am) June 15**

**III. The final exam (120 minutes) is on Friday of the last week (Friday, Week-6) June 26 (9:00-11:00am).**

- Exams will 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/CUP 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.
- **Final exam must be taken during the scheduled time only!** Final exam: two hours MANDATORY. The final exam must be taken ONLY on the date scheduled or a grade of F will automatically result. Cumulative final exam is comprehensive and is two hours duration.
- **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 an exam be taken at a time and date other than that assigned.**

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%
Participation/ <b>CUPS</b>	5% each (total 10%)
Unit Exam 1	20%
Unit Exam 2	20%
<b>Final Exam</b>	<b>35%</b>
Total	100%

**Participation will be based on your involvement in videos on Panopto and Forum participation. For example, if 80% of 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 credit points. You may watch the videos on any speed. CUPs scores will be incorporated with the participation points for the final score calculation. ALL exam, quiz, homework, participation points 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. CUPs and exams: Only mistakes such as tallying up points by the lecturer are eligible for regarding.

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

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

### **Tentative Lecture Schedule**

The exams will contain all material covered by the date of each exam as states in the schedule published on Sakai or as announced. Final exam is cumulative.

- *May 25<sup>th</sup> Memorial Day: No classes, no sessions*
- *May 19<sup>th</sup> Last day to drop a course without a grade of "W".*
- *June 19<sup>th</sup> Last day to withdraw from session without a penalty grade of "WF"*

**Please note: that materials from this course 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.**

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### **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.**



### **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/>.

### **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. 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>)