

## Biochemistry (CHEM 361/BIOL 366) Syllabus - Fall 2023



**Professor:** Dr. Colin Gates, cgates4@luc.edu

**Lecture:** Tuesday and Thursday 4:15-5:30 PM, Flanner Auditorium

**Discussion:** Wednesday 10:25-11:15 AM (Section 006), 11:30 AM-12:20 PM (section 007), and 12:35-1:25 PM (section 008), all in Flanner Hall room 007.

**Office hours:** Friday 9-11 AM in Flanner Hall Rm. 22 (**will be changed after week 1**)

**Prerequisites:** Organic Chemistry II (CHEM 222/224 & 226)

*Recommended background: General biology, general physics, and analytical chemistry*

**Description:** Biochemistry 361/366 is an introductory course to major concepts in biochemistry aimed at nonmajor students with a particular focus on building a background for health and biomedical sciences. Concepts covered include protein/enzyme structure and function, nucleic acid chemistry, carbohydrate metabolism and uses, lipid structure/function, overall metabolic pathways, bioenergetics, cell membranes, and regulatory mechanisms. This course can be thought of as “the chemistry of life processes” and accordingly takes concepts from prior chemistry courses and applies them to a biological setting.

**Textbook:** *Biochemistry: An Integrative Approach*, 1st Edition, by John Tansey. It is also necessary to obtain a WileyPlus account for homework- instructional flyers are found in the Resources tab of your Discussion section Sakai page (006, 007, or 008). **This material (textbook, homework, lecture components, and exams) is copyrighted and should not be replicated or shared outside class.** There are two versions of this textbook and while Wiley is good about fixing your WileyPlus, if you get the wrong one you will need to go through them to fix it.

### Other Required Materials:

- Computer capable of using WileyPlus
- Scientific (not graphing) calculator
- Access to Sakai – necessary materials are on the Sakai site

**Remote Materials:** (not required unless you’re attending lecture/discussion remotely)

- Zoom installed on your computer/phone
- Webcam or phone camera

**Useful References:** *Principles of Biochemistry* by Albert L. Lehninger, David L. Nelson, and Michael M. Cox; *Biochemistry* by Jeremy M. Berg, John L. Tymoczko, and Lubert Stryer (any edition of either; these are not required but may be useful to you). Any additional material not found in the primary course textbook will be posted on Sakai ahead of the relevant lecture and students are not required to purchase additional books. Both of the recommended references are in the library and the former can sometimes be found on NCBI for free. Our textbook is also in the library but I don’t recommend relying on the library for it.

## Topics Covered (in chronological order):

1. Chemical Foundations of Biochemistry (Ch. 1)
2. DNA and Modern Biotechnology (Ch. 2)
3. RNA, Transcription, and Translation of the Genetic Code (Ch. 2)
4. Amino Acid and Peptide Biochemistry (Ch. 3)
5. Solvent/Environment Effects on Biochemistry (Ch. 1, supplements)
6. Enzyme Kinetics (Ch. 3)
7. Protein Regulation and Allostericity (Ch. 3, 4, 8)
8. Energy Metabolism & Thermodynamics (Ch. 1, 2, 12)
9. Carbohydrate Structure & Function (Ch. 6)
10. Glycolysis, Gluconeogenesis, and Glycogen Metabolism (Ch. 6, 8)
11. Pyruvate and the Citric Acid Cycle (Ch. 6, 7)
12. Electron Transport Chain & Oxidative Phosphorylation (Ch. 7)
13. Nitrogen and Lipid Metabolism (Ch. 9, 10, 11)
14. Lipids and Biomembranes (Ch. 5, 8, 9)
15. Anaplerotic Metabolism, Metabolic Shuttling, & Medical Biochemistry (Ch. 6, 7, 12)

If we have time we may additionally cover lipids, steroids, and eicosanoids in greater detail, as well as introductory biochemistry of photosynthesis. In addition to the chapters specified, supplements may be posted on the Sakai page prior to the relevant week's lectures.

**Homework:** There will be one graded homework assignment in WileyPlus per week. Assignments will be given after Thursday's lecture and due by 11:59 PM Central time the following Wednesday (except Thanksgiving week). Students are strongly encouraged to supplement this work with in-book questions. Homework is graded at 1.5% of final grade per assignment for a total of 20% of final grade (it's actually 19.5% if you do the math but the .5% is free). **There are no extensions on homework for any reason; assignment close time is automated. You are responsible for making sure your homework is completed by the due date.**

**Discussion:** Discussion attendance is strongly encouraged. Attendance by Zoom is acceptable but in-person is strongly preferred as student questions in-person will be given priority and it may be difficult to see or hear during mixed-format sessions. Zoom links will be provided via Resources in the discussion section Sakai site. We have optional discussion questions which will be covered in any week and provided via WileyPlus on the day of.

**Contact:** Always make sure any e-mail contact to Dr. Gates has a subject line beginning with CHEM361. E-mail sent without this header may wind up in a junk folder. E-mail will be answered within 24 hours either via direct reply or via verbal response in class, discussion, or office hours. If there is no response in this time frame, please check to make sure you used the correct format and resend your message. Do not contact teaching staff for other sections unless directed by the instructor; they cannot necessarily help you. Office hours will be held in Flanner Hall 022 from 9:00 to 11 AM on Friday, Sept. 1<sup>st</sup>, and for all weeks thereafter at the times specified by poll. Office hours will be held in-person and remote concurrently via Zoom; please see Resources in the lecture Sakai site for Zoom links.

**Accommodations:** All lectures be recorded via Zoom and posted after class. At this time discussions will be live-streamed but not recorded due to the constraints of the assigned room, but this policy may change if suitable equipment becomes available for concurrent recording and livestreaming as is the case in lecture. If any university obligations or illness prevent the instructor

from being present, lectures will be pre-recorded and posted on Sakai. Use of the Sakai Forum is encouraged for assistance from your fellow students in addition to the Discussion sessions. Students seeking accommodations for disabilities must send me an official letter from the Student Accessibility Center SAC in the first week of classes (by the end of the day on September 5<sup>th</sup>). 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. Further information is available at <http://www.luc.edu/sac/>. Per SAC policy, all students with the documented time extension will start any exams 30 minutes before the scheduled time of the exam (although this is subject to alteration at SAC discretion). Please follow details sent in a general announcement before each exam. Make-ups are not available for any component of this course for any reason, though exam grading will be adjusted as per the Grading section if a student misses an exam for a valid medical reason and supplies documentation within one week (168 hours) of the missed exam.

**Exams:** There will be a total of four exams: three midterms and a final. Exams are closed-book; students may not consult their notes, the Internet, course materials, other students, or any resource other than their own existing knowledge and logistical questions to the proctor. Students may use a non-graphing calculator, scratch paper, pen, pencil, and eraser during exams. All students must follow LUC Academic Integrity policies (discussed below) and participation in any exam is implicitly treated as an honor pledge. Violations will result in a grade of zero being assessed for the exam and be reported for potential further penalty. Exam dates and times are as follow:

- Thursday, September 28<sup>th</sup> at 4:15 PM (during lecture) – 40 minutes
- Tuesday, October 31<sup>st</sup> at 2:45 PM (during lecture) – 40 minutes
- Tuesday, December 5<sup>th</sup> at 4:15 PM (during lecture) – 40 minutes
- Final exam: Tuesday, December 12<sup>th</sup> at 4:15 PM – 2 hours; please see the official exam calendar for further explanation of finals schedule:  
<http://luc.edu/academics/schedules/index.shtml>

Students will receive explanations of exam format via Sakai one week prior to the exam. Students are expected to come adequately prepared for exams; additional resources are limited. There are no retakes or substitutions available for any exam for any reason, and exams can only be taken at the time specified.

**Grading:** The value of course components to the final grade is as follows:

WileyPlus homework	20%
Midterm Exam 1	20%
Midterm Exam 2	20%
Midterm Exam 3	20%
Final Exam	20%
Total	100%

If a student remains in good standing through the class and attends every lecture and discussion session, that student is eligible to have their lowest midterm grade dropped and the other two midterms and final increased in value by one third to compensate (you will be graded on whichever system produces a higher result). If a student misses an exam and wishes to remain eligible, that student may inform the instructor within 24 hours of exam start time. Valid reasons for missing an exam include but are not limited to: major illness or injury, death of a close family member, weather

disaster, transportation unavailable. Documentation is required and the instructor reserves the right to determine validity of excuse. Students in good standing with perfect attendance may similarly drop their lowest WileyPlus grade and take the average of the remainder if all assignments are completed on time- excuses will not be accepted for this component. Do not request extra credit or make-up assignments; none will be given on request.

It is the student's responsibility to keep track of all announcements, policies, and changes to the class. The instructor reserves the right to change or adjust to this syllabus as necessary, including, but not limited to, the grading policy and course schedule. The instructor will alert students via Sakai of any changes.

Regrading is only available for technical and grading errors. The following are specifically not eligible for regrading: students' typos, failure to comply with directions for any reason, and any personal issues during exams not reported within 24 hours. Students are responsible for reading all directions carefully and asking the instructor if anything is not clear. Students have the option to fill out an Incomplete Grade Form in the event of major extenuating circumstances causing disruption of the final exam, at the instructor's discretion, as documented here:

<https://www.luc.edu/regrec/faculty.shtml>

### Breakdown of letter grades:

A	A-	B+	B	B-	C+	C	C-	D	F
100-93	92-90	89-87	86-83	82-80	79-77	76-73	72-70	69-60	<60

The instructor reserves the right to apply an upward curve or baseline to the final grades if needed but is under no obligation to do so.

### Relevant Dates:

- August 29<sup>th</sup>: First lecture
- August 30<sup>th</sup>: First discussion
- September 5<sup>th</sup>: Late registration ends
- September 10<sup>th</sup>: last day to withdraw without a "W"
- September 11<sup>th</sup>: Last day to switch between credit/audit and to opt into pass/no pass grading
- October 10<sup>th</sup>: Mid-semester break; no class
- November 3<sup>rd</sup>: Last day to withdraw with a "W"; a "WF" is assigned after this date
- November 22<sup>nd</sup>-25<sup>th</sup>: Thanksgiving; no class
- December 7<sup>th</sup>: Last day of classes
- December 12<sup>th</sup>: Final Exam

More information available here: <http://www.luc.edu/academics/schedules>

**All materials from this course are copyrighted. No material, including any component of the exam, can be shared outside the course without express written permission from the instructor.**

## **University and Department Policies**

### **Syllabus Statement On Recording**

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 Sakai course is unpublished (i.e. shortly after the course ends, per the [Administrative Schedule](#)). Students who prefer to participate via audio only will be allowed to disable their video camera so only audio will be captured. Please discuss this option with your instructor.

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.

### **Masking Statement**

Students are encouraged to wear masks while in in-person lectures, discussions, and exams during this class for the health and safety of those around them and any vulnerable individuals who your classmates may come into contact with. This policy is specifically subject to revision.

### **Academic Integrity**

All students are expected to be fully responsible for their own work. All submitted work must be only your own work. Plagiarism, exam “cheat sheets”, and other academic dishonesties will not be tolerated- students caught cheating in any way on any assignment will receive a grade of zero on that assignment and a report to the Chemistry Department Chair and the School of Arts and Sciences Dean with potential further consequences to follow within the class and/or the student’s academic transcript. Please see the Academic Integrity section of the Undergraduate Studies Catalog for more information: [https://www.luc.edu/academics/catalog/undergrad/reg\\_academicintegrity.shtml](https://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml)

The following are explicitly considered academic dishonesty:

- Plagiarism – using the words or ideas of others without proper source acknowledgement.
- Self-plagiarism – use of one’s own work for multiple submissions for credit without approval.
- Purchasing or otherwise acquiring someone else’s work to submit as your own.
- Fabrication of data, observations, interviews, surveys, or other information, or undocumented/improperly documented alteration of data.
- Collusion – working with other students on any exam or assignment without instructor approval.
- Use of work submitted by another student in a previous semester.
- Cheating – use of unauthorized study aids or materials during an exam, communication or distribution of unapproved exam materials, use of a proxy to take an exam on a student’s behalf, falsifying medical or otherwise relevant documentation, looking up answers on the Internet during an exam, or asking another student for answers during an exam.
- Academic misconduct – includes allowing others to use your work improperly.

### **Registration**

Students may not attend classes for which they are not officially registered. Registration must be completed in LOCUS by the end of the day on Tuesday, September 5<sup>th</sup>. Unregistered students will be asked to leave the class in keeping with LUC policies. Students may opt into Pass/No-Pass or Audit status until the end of the day on Monday, September 11<sup>th</sup>. Requests for Pass/No-Pass status are handled through the student’s Academic Advisor, NOT the instructor.

### **University-Authorized Absences**

Students may be allowed to miss class without penalty in order to participate in University-sponsored events if the absence schedule is conveyed in full to the instructor by the appropriate academic advisor (not the student) within the first week of classes, i.e. by the end of the day on September 5<sup>th</sup>. After this time no further approval will be granted for any reason. Athletes, please see <https://www.luc.edu/athleteadvising/attendance.shtml> for specific information.

### **Religious Accommodations**

Any student anticipating a religious situation or holiday which would affect absence or performance must inform the instructor within ten calendar days of the beginning of classes (by the end of the day on September 7<sup>th</sup>) to be eligible for any accommodations.

**All exams are in person.** This policy may be revised in response to change in University policy. Unless such a change is made, however, all students are expected to be physically present for all exams and no students will be permitted to have remote exams.

**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). The Department advises that it is preferable to complete a course with a grade of C or C-, and to demonstrate growth in future coursework, than to withdraw from a course.

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: <https://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.

## **Tutoring Center**

Tutoring for this class may be available. Please see [http://www.luc.edu/tutoring/Small\\_Group\\_Info.shtml](http://www.luc.edu/tutoring/Small_Group_Info.shtml) for more information on availability.

## **Harassment (Bias Reporting)**

*It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of their 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>*

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

In case of transition to online classes at any point, this course and its policies were designed to facilitate its use as a HyFlex or fully online educational experience. While we are not expecting a major disruption as has occurred in past semesters, in the event of a lockdown exams will be delayed until in-person times are available and classes will be held remotely at usual times.