

BCHM 36100 SYLLABUS
Molecules
CRN: 11183
Course Credit Hours: 3
Spring, 2026

INSTRUCTIONAL MODALITY:

Face-to-Face, Lecture/Small Group Activity

All lectures will be recorded and available for students to download from boilercast:

<http://www.itap.purdue.edu/learning/tools/boilercast/>

Note: Small group discussions and activities cannot be captured efficiently and recordings will not fully replicate these activities outside of class. Materials used during class will be provided on Brightspace.

Emergency Zoom: If it is necessary to move the course online due to emergency, a zoom link will be provided on Brightspace.

PREREQUISITES

1. Students must have completed the following courses or an approved equivalent with a minimum grade of C-:
 - a. BIOL 11000 or BIOL 12100.
 - b. CHM 25500 or CHM 26505.
2. Students must have completed or be concurrently enrolled in (minimum grade of C- required if completed):
 - a. CHM 25600 or CHM 26605.

Students are expected to have a basic understanding of organic chemistry and biology. Students will be expected to understand information from BCHM 100, so students who have not taken this class should make sure they are familiar with the material covered in this introductory Biochemistry class.

COURSE OBJECTIVES

Students will learn that the chemical principles derived from the study of small molecules apply to macromolecules; that the special properties of water help define the structure, reactivity, and function of macromolecules; about the structures and properties of membranes, polysaccharides, oligonucleotides, and proteins, and how these macromolecules are assembled; how protein structures are determined using x-ray crystallography; the thermodynamic and kinetic principles relevant to transport, binding, and catalysis within the cell, and related energy transduction principles; how several enzymes work in detail; and how drugs can be used to block enzyme reactions.

LEARNING OUTCOMES ADDRESSED BY THIS COURSE

Students will be able to:

1. Able to describe the chemical structures of the building blocks of biological macromolecules, including amino acids, sugars, and fatty acids.
2. Demonstrate knowledge of the higher order structures of proteins, nucleic acids and polysaccharides, and explain the forces and interactions that drive formation of these structures.
3. Use qualitative and quantitative terms to describe how receptors bind ligands.
4. Discuss the concept of binding cooperativity and provide examples of its importance in biology.
5. Use quantitative terms to describe the catalytic activity of an enzyme.
6. Understand the principles of enzyme catalysis and regulation.
7. Demonstrate knowledge of lipid membrane structure and function.
8. Recognize and draw different carbohydrates and identify classes of glycoproteins.
9. Understand how molecules can be transported across membranes.
10. Biochemistry students will understand the contributions of our discipline to society, including improvements to medicine, agriculture, the economy and the environment.

TEXTBOOK (required)

- Berg, J.M, Gatto, G.J. Jr., Hines, J., Tymoczko, T.L, and Stryer, L. Biochemistry 10th edition (2023) (W. H. Freeman & Co.) ISBN: 9781319333621 (paperback); ISBN: 9781319498405 (loose leaf)

OR

- E-editions with electronic problems, support, etc. are also available

BRIGHTSPACE

The syllabus for the course, lecture notes, readings and grading keys will be available via the Purdue University Brightspace site at:

<https://purdue.brightspace.com/d2l/login>

TECHNOLOGY REQUIREMENTS (in-class computer and calculator)

In-class material may require access to Brightspace. Please **bring a laptop or tablet computer to class capable of using Brightspace for these sessions**. It may be possible to access material on a smart phone, but less convenient. Access to the internet could be helpful during other class sessions for answering practice questions or researching problems. I also recommend bringing a calculator to class since this can be useful when we are working on some problems and calculations.

PURDUE HONOR PLEDGE

Purdue's Honor Pledge was developed by students to advance a supportive environment that promotes academic integrity and excellence. It is intended that this pledge inspires Boilermakers of all generations to stay "on track" to themselves and their University. ***"As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue."***

ASSESSMENT

The assessments for this course will include:

Exam 1	100 points
Exam 2	100 points
Exam 3	100 points
Final Exam	100 points
<u>Homework</u>	<u>100 points</u>
Total	500 points

Bonus Pop-Quizzes will be held in class without announcement for extra points (1 pt per quiz). There will not be any opportunity to make up these bonus pop quizzes if you are absent from class for any reason since these are bonus points.

The cutoff values for letter grades are as follows:

450 points	90%	A
400 points	80%	B
350 points	70%	C
300 points	60%	D
299 points and below		F

Final Exam and Grade Improvement

The final will be comprehensive. *It will count for 100 points unless the Final Exam score is greater than your score on any of the semester exams (Exam 1, Exam 2 or Exam 3) in which case the Final Exam score will be doubled (200 pts), and your lowest semester Exam score will be dropped. Please note that Brightspace totals might not reflect this system, so do not worry if the Brightspace total does not match this calculation after you receive your final grade. These calculations are applied manually prior to calculating final letter grades.*

Exam Absences

Missing an exam or quiz will result in a grade of 0 being recorded unless documented justification for the absence is presented. The instructor must be contacted in advance via email. Any request to be excused from an exam must include official documentation (doctor's note, request from academic advisor, COVID restriction, etc) explaining why the exam was or will be missed. Makeup exams will be scheduled in consultation with the instructor.

Pop-quizzes

The bonus pop-quizzes will be scheduled randomly without notice during lecture time. These points will be added to your final grade (bonus), and can help you improve your grade. We will not allow any re-scheduling of these pop quizzes if you miss a lecture for any reason because these are bonus points to encourage attendance and regular studying.

Homework

Students will be assigned required reading from the relevant chapter of the textbook corresponding to each module, together with required completion of the problem sets at the end of the chapter. In addition, short questions and/or problem sets or activities will be assigned for some modules. Some modules have both chapter problems and a separate question set (homework assignment), while others only have chapter problems. Please see each module in Brightspace for instructions.

Grading and Corrections

We will do our best to grade with accuracy and consistency, but errors may occur. If you have any disagreements with the way your exam or assignment has been graded, please consult with a course TA. If you wish to have your exam or quiz regraded then submit a written explanation for why the score should be changed. Requests for regrading must be submitted (email or in-person) no later than one week after the graded exam, quiz or assignment has been returned.

EXTRA CREDIT

There are ~18 bonus pop-quizzes and at least two bonus homework assignments. Please attend class for the opportunity to gain these bonus points.

HOW TO SUCCEED IN THIS COURSE

If you want to be a successful student:

- Attend all lectures unless you are ill. The unscheduled pop-quizzes are designed to encourage attendance because this will help you succeed.
- Print out the lecture schedule (see syllabus) and plan for key dates like exams and homework submission. Use a calendar or Brightspace to organize your schedule and keep on top of deadlines.
- Complete the homework assignment for each module by reading the relevant chapter of the textbook and completing the simple problems or questions. These questions are designed to encourage you to read the chapter and make sure you understand the material we have covered in lectures. Completing these reading assignments at the same time as we cover material in class is much easier than reading them all just before the exam!

- Attend office hours and ask the TA for help with any material you have trouble understanding.
- Participate in the active learning exercises in the lecture. We will do problems together and in small groups to help apply the concepts we learn in class. Bring paper, pencil, and a calculator to participate. Writing and drawing will help you understand and memorize key concepts!
- Some memorization is required for Biochemistry students. We will provide different resources (apps, flashcard templates) to help you master information that you need to be able to quickly recall to succeed in this course, and in later Biochemistry courses.

OBTAINING HELP

The professor and the TA will be available to answer your questions immediately after class or at office hours. Alternatively, you can submit questions by e-mail. We will do our best to answer the question by return e-mail within 24 hours or in the next class period for items relevant to all students. Alternatively, students may wish to use the discussion forum on the course website where peers and instructors can provide responses. This site will be monitored by the instructors to identify complications and student difficulties.

ON-LINE COURSE EVALUATIONS

During the last two weeks of the semester, you will be provided an opportunity to evaluate this course and your instructor(s). To this end, Purdue has transitioned to online course evaluations. On Monday of the fifteenth week of classes, you will receive an official email from evaluation administrators with a link to the online evaluation site. You will have two weeks to complete this evaluation. Your participation in this evaluation is an integral part of this course. Your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

ABSENCE POLICY FOR STUDENTS

This course follows Purdue's academic regulations regarding attendance, which states that students are expected to be present for every meeting of the classes in which they are enrolled. In-person attendance will not count directly toward student grades, but BCHM 361 includes some problem-solving activities during class so failure to attend could place students at a disadvantage. In addition, missing the unscheduled pop-quizzes could decrease your grade. When conflicts or absences can be anticipated, such as for University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification to the instructor is not possible, the student should contact the instructor as soon as possible by email or phone. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control the student's representative should contact the Office of the Dean of Students (odos@purdue.edu , 765-494-1747). In cases falling under the **excused absence** regulations, the student or the student's representative should complete the forms at the [Office of the Dean of Students website](#) for instructor notification. *Under academic regulations, excused absences may be granted for cases of grief/bereavement, military service, jury duty, parenting leave, or emergent or urgent care medical care.* For details, see the [Academic Regulations & Student Conduct section](#) of the University Catalog website. Please note that the university policy for urgent medical care absences does not include minor illnesses or primary care medical appointments, those issues are handled through direct contact with the instructor.

The University expects each student to be responsible for class-related work missed because of an unavoidable absence. Only the instructor can excuse a student from a course requirement or responsibility.

ACADEMIC GUIDANCE IN THE EVENT A STUDENT IS ILL

Please do not attend class if you are feeling ill or have symptoms, but do email the instructor or TA to let us know of your absence. Unless the absence falls under the University excused absence regulations (see section above), any work due should be submitted on time via Brightspace. However, please contact the TA or instructor with questions about this since we can be flexible with deadlines if you are unable to complete work due to illness.

ACADEMIC MISCONDUCT

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern. Information on Purdue's policies with regard to academic misconduct can be found at:

<http://www.purdue.edu/odos/osrr/academic-integrity/index.html>

You should familiarize yourself with these policies, particularly if you are new to US academic institutions. All apparent violations of these policies will be referred to the Office of the Dean of Students (ODOS).

"Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, [University Regulations](#)] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972]

More specifically, the following are a few examples of academic dishonesty which have been discovered at Purdue University.

- paying someone else to write a paper and submitting it as one's own work
- giving or receiving answers by use of signals during an exam
- copying with or without the other person's knowledge during an exam
- doing class assignments for someone else
- plagiarizing published material, class assignments, or lab reports
- turning in a paper that has been purchased from a commercial research firm or obtained from the internet
- obtaining an unauthorized copy of a test in advance of its scheduled administration
- using unauthorized notes during an exam
- obtaining a test from the exam site, completing and submitting it later
- altering answers on a scored test and submitting it for a regrade

Plagiarism is a special kind of academic dishonesty in which one person steals another person's ideas or words and falsely presents them as the plagiarist's own product. This is most likely to occur in the following ways:

- using the exact language of someone else without the use of quotation marks and without giving proper credit to the author
- presenting the sequence of ideas or arranging the material of someone else even though such is expressed in one's own words, without giving appropriate acknowledgment
- submitting a document written by someone else but representing it as one's own.

COPYRIGHT

We use many materials (e.g. figures,) that are derived from published sources. As such, they cannot be sold or bartered without express written permission from the authors. Please do not provide these materials to shared websites outside of Brightspace. [Exams and homework assignments from any year should never be shared on websites or online forums.](#)

NON-DISCRIMINATION POLICY

Nondiscrimination -- *Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.*

Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability, or status as a veteran. The University will conduct its programs, services and activities consistent with applicable federal, state and local laws, regulations and orders and in conformance with the procedures and limitations as set forth in (http://www.purdue.edu/purdue/ea_eou_statement.html) which provides specific contractual rights and remedies.

Anti-Harassment Policy -- Purdue University is committed to maintaining an environment that recognizes the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding and mutual respect; and encourages its members to strive to reach their potential. The most effective way to work toward preventing Harassment is through education that emphasizes respect for every individual. Harassment in the workplace or the educational environment is unacceptable conduct and will not be tolerated. Purdue University is committed to maintaining an educational and work climate for faculty, staff and students that is positive and free from all forms of Harassment. This policy addresses Harassment in all forms, including Harassment toward individuals with legally protected status for reasons of race, gender, religion, color, age, national origin or ancestry, genetic information or disability and Harassment toward individuals for other reasons such as sexual orientation, gender identity, gender expression, marital status or parental status. The University will not tolerate Harassment of its faculty, staff or students by persons conducting business with or visiting the University, even though such persons are not directly affiliated with the University. Purdue Anti-Harassment Policy (III.C.1): <http://www.purdue.edu/policies/ethics/iic1.html>

EMERGENCIES



In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted on the course website or can be obtained by contacting the instructors or TAs via email. You are expected to read your @purdue.edu email on a frequent basis.

EMERGENCY NOTIFICATION PROCEDURES are based on a simple concept – if you hear a fire alarm inside, proceed outside. If you hear a siren outside, proceed inside.

- **Indoor Fire Alarms** mean to stop class or research and immediately **evacuate** the building.
 - Proceed to your Emergency Assembly Area away from building doors. **Remain outside** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.
- **All Hazards Outdoor Emergency Warning Sirens** mean to immediately seek shelter (**Shelter in Place**) in a safe location within the closest building.
 - “Shelter in place” means seeking immediate shelter inside a building or University residence. This course of action may need to be taken during a tornado, a civil disturbance including a shooting or release of hazardous materials in the outside air. Once safely inside, find out more details about the emergency*. **Remain in place** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.

In all cases, you should seek additional clarifying information by all means possible...Purdue Emergency Status page, text message, email alert, TV, radio, etc...review the **Purdue Emergency Warning Notification System multi-communication layers at: <https://www.purdue.edu/ehps/emergency->*

[preparedness/purduealert/index.php](https://www.purdue.edu/emergency_preparedness/flipchart/index.html)

EMERGENCY RESPONSE PROCEDURES:

- Review the **Emergency Procedures Guidelines**
https://www.purdue.edu/emergency_preparedness/flipchart/index.html
- Review the **Building Emergency Plan** (available on the Emergency Preparedness website or from the building deputy) for:
 - evacuation routes, exit points, and emergency assembly area
 - when and how to evacuate the building.
 - shelter in place procedures and locations

MENTAL HEALTH

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [WellTrack](#). Sign in and find information and tools at your fingertips, available to you at any time.

If you need support and information about options and resources, please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc. sign up for free one-on-one virtual or in-person sessions with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect. If you have any questions, please contact Purdue Wellness at evans240@purdue.edu.

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours.

BASIC NEEDS SECURITY

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency assistance from the [Critical Needs Fund](#)

ACCESSIBILITY AND ACCOMODATIONS

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247

Topic	Chapter	Assignment
Introduction & A: Biochemistry in space and time	Chap. 1	
A: Biochemistry in space and time	Chap. 1	
A: Biochemistry in space and time	Chap. 1	
MLK - NO CLASS		
A: Biochemistry in space and time	Chap. 1	
B: Protein composition and structure	Chap. 2	
B: Protein composition and structure	Chap. 2	HW1 & Chap. 1 due
B: Protein composition and structure	Chap. 2	
B: Protein composition and structure	Chap. 2	
B: Protein composition and structure	Chap. 2	
C: Carbohydrates and glycoproteins	Chap. 11	
Exam #1 Review Session		HW2 & Chap. 2 due
EXAM 1 (Chapters 1, 2)		
C: Carbohydrates and glycoproteins	Chap. 11	
D: Lipids and biological membranes	Chap. 12	
D: Lipids and biological membranes	Chap. 12	
D: Lipids and biological membranes	Chap. 12	HW3 & Chap. 11 due
E: Binding and molecular recognition	Chap. 3	
E: Binding and molecular recognition	Chap. 3	
E: Binding and molecular recognition	Chap. 3	Chap. 12 due
F: Enzymes – core concepts and kinetics	Chap. 5	
F: Enzymes – core concepts and kinetics	Chap. 5	
F: Enzymes – core concepts and kinetics	Chap. 5	HW4 & Chap. 3 due
Exam #2 Review Session		
EXAM 2 (Chapters 11, 12, 3)		
F: Enzymes – core concepts and kinetics	Chap. 5	
G: Enzyme catalytic strategies	Chap. 6	Chap. 5 due
SPRING BREAK – NO CLASS		
G: Enzyme catalytic strategies	Chap. 6	
G: Enzyme catalytic strategies	Chap. 6	
G: Enzyme catalytic strategies	Chap. 6	
G: Enzyme catalytic strategies	Chap. 6	
H: Enzyme regulatory strategies	Chap. 7	
H: Enzyme regulatory strategies	Chap. 7	HW5 & Chap. 6 due
H: Enzyme regulatory strategies	Chap. 7	
H: Enzyme regulatory strategies	Chap. 7	
Exam #3 Review Session		Chap. 7 due
EXAM 3 (Chapters 5, 6, 7)		
I: Membrane channels and pumps	Chap. 13	
I: Membrane channels and pumps	Chap. 13	HW6 due.

I: Membrane channels and pumps	Chap. 13	
I: Membrane channels and pumps	Chap. 13	
J: Signal-transduction pathways	Chap. 14	Chap. 13 due
J: Signal-transduction pathways	Chap. 14	
J: Signal-transduction pathways	Chap. 14	
Final Exam Review Session		
FINAL EXAM (comprehensive)		TBD**

*Exams 1 – 3 will be designed for 1 hour, but I will provide 2 hours for students who prefer extra time. The Friday prior to each exam will have an exam review session with the professor. The lecture time on the exam day (Monday) will be a help/study session led by the TA and is optional (but highly recommended).

**The final exam date, time and location will be released early during the semester and announced on Brightspace.