

Spring 2023 BIOCHEM 320 Section 1 Elementary Biochemistry (3 credits)

Location: Integrated Sciences Building (ISB) 135

Meeting times: T/Th from 8:30 – 9:45 am

Instructor: Dr. <PROF_FULL_NAME>

Course Description:

To make life possible in a cell, a network of chemical processes must occur. While this definition of metabolism makes living cells appear simple, this is far from the truth. These microscopic units are like sophisticated, miniature factories, regulated by complex mechanisms that ensure energy is available and is used for the maintenance of life. In this biochemistry course, you will explore the intricate, well-coordinated biochemical processes that occur in these factories. At a fundamental level, these processes are driven by chemical principles; we will learn these principles and then apply them in our study of carbohydrate and lipid metabolism. Over the course of the semester, you will be challenged to continue developing your learning style as you explore answers to the “hows” and “whys” of these processes, apply the biochemical concepts to realistic situations, and compare how these processes vary in different cells.

Prerequisite:

CHEM 250 / 261 / 265 or equivalent with a grade of 'C-' or better.

Course Website:

(<https://umass.moonami.com>)

Moodle will be used to administer class materials (e.g., syllabus, course schedule, lecture materials, etc.). Links to Echo360 (for lecture recordings and pre-recorded content), Zoom meetings, and MasteringChemistry (homework) are at the top of the Moodle Course page.

Overview for Spring 2023:

In designing the course structure, I reflected on what we learned over the last three years about practices that effectively support student learning while providing flexibility. I acknowledge that students face all types of challenges in a given semester, not just COVID-19, and this may influence the decisions you make. At the same time, I firmly believe that flexibility with real-time instruction and opportunities for peer interactions are valuable activities for learning – and

supported by data. And so, here I summarize the ways you will engage with your peers and the course concepts.

- Course readings and videos will be digitally accessible.
- Class sessions will occur on Tuesday and Thursday mornings and students can choose to participate in person, by Zoom, or asynchronously. This time will be spent with lecturing, poll questions and group activities. All class sessions will be recorded on Echo360.
- Professor <PROF_LAST_NAME> Tea Times will occur two times per week: one in person and one virtual (Zoom).
- Peer teaching assistant (TA) led Discussion Sessions will occur every week by Zoom and in person. The exact times and location will be posted. Note: Worksheets and activities in these sessions will be determined by undergrad TAs in consultation with Professor <PROF_LAST_NAME>.
- Supplemental Instructor (SI) sessions will occur twice per week. Details will be forthcoming. Note: Worksheets and activities in these sessions will be designed by the SI.
- Homework assignments and discussion forums will take place asynchronously.
- Exams (and make-ups) will be completed in person and on campus unless you require a special accommodation.

Student Learning Goals:

When the course is complete you will be able to:

- explain the chemical principles that dictate the structure, function, and behavior of proteins, carbohydrates, and lipids.
- describe the carbohydrate and lipid biochemical pathways and their regulatory mechanisms that provide or store cellular energy.
- compare and contrast regulation of carbohydrate and lipid biochemical pathways in muscle and liver cells.
- apply biochemical concepts to a realistic problem and articulate a logical reason for your answer.
- evaluate how you learn biochemical concepts and revise to deepen your understanding.

Required Course Materials:

I only require materials that I believe will help you meet the course learning goals with the smallest financial impact.

1. Access to Mastering Chemistry with eTextbook (Biochemistry, Concepts and Connections, 2nd edition by Appling, Anthony-Cahill, and Mathews (2018), Pearson Education).

- Do not purchase an Access Code through ecampus because it will be more expensive. Refer to Moodle for registration instructions, including a Course ID. The total cost for both will be \$80.
 - You have immediate access to Mastering Chemistry and the eText the moment you register.
 - If you want a print copy of the textbook, you may order one for an additional fee (\$50) when you register for Mastering Chemistry or you can use the following link:
<http://www.pearsonstore.com/bookstore/mastering-chemistry-print-offer-for-biochemistry-concepts-9780134761220>
2. iClicker2 remote (handheld device for use in the classroom) or iClicker Mobile App (works on cell phone, tablet, or computer & for use anywhere)
- New remotes may be purchased through <https://umass.ecampus.com>, ISBN 9781498603041.
 - Older remotes are also acceptable.
 - Information about the iClicker Mobile Student App can be found at <https://www.iclicker.com/students/apps-and-remotes/apps>

Assignments and Graded Components:

Grade Component:	Percent of total class grade:
1) Attendance (iClicker or asynchronous)	10%
2) Participation – forum posts	20%
3) Homework	10%
4) Exams	60% (4x, weighted equally)

Details for each grade component

Attendance (10%):

Purpose: I believe strongly that class time is essential for helping students meet the course goals; but evaluation of class attendance must provide both flexibility and accountability. To provide flexibility, all students will choose in real-time whether to attend in person, remotely (Zoom), or asynchronously. To provide accountability, students will be allowed 4 absences (out of 24 classes) starting Tuesday, February 14).

Details:

- Presence in person or by Zoom will be determined with iClicker remote / mobile app. If using the iClicker mobile app, there will not be any restriction based on location, so you can participate anywhere during class time.

- Asynchronous attendance will be determined with a weekly Moodle questionnaire.
- Each class day is worth 1 point. To earn the 1 point, you either need to answer 75% of the iClicker questions OR complete the asynchronous Moodle questionnaire. Accuracy does not matter for either of these activities.
- A final percentage will be determined based on the total points out of 20. The maximum points you could earn is 20 because all students are allowed to miss 4 days.
 - Example calculation #1: Marlene attends 21 of 24 class days, thus she achieves a 100% attendance score because her total points (21) are greater than 20.
 - Example calculation #2: Marlene attends 15 of 24 class days, thus she achieves a 75% because she earned 15 out 20 points.

Forum posts (20%):

Purpose: An old learning adage goes something like this ... one learns and understands concepts more deeply when they have a chance to teach someone else. Hence, I am using asynchronous discussion forums to give you time to process the information and then “teach” or “explain to someone else”. Evaluation is not based on accuracy, but rather on the depth of your engagement with the prompts. Each discussion forum will be moderated by an undergraduate TA, so that you can receive direct feedback during the semester.

Details:

- At the semester’s start, you will be placed in a small peer group of ~30-35 students. Each week, you will engage asynchronously with them by responding to prompts, and then, occasionally posting a reply.
- Discussion forums start Week 1 and end Week 13. During Weeks 1 - 7 you can earn 3 participation points, two points for a post and one point for responding to a classmate’s post. Starting Week 8, students will be allowed to post two responses each week to make-up forum points, thus the total will be 4 points for Weeks 8 - 13.
- All posts and responses are due by Sunday at midnight and late ones will not receive any credit. Evaluation will be based on depth and completion.
- **Important:** In order to respond to a classmate you must post to the forum and wait 30 minutes. This 30 minute delay is part of the Moodle app and cannot be adjusted.
- At the semester’s end, the percentage will be determined out of 30 points. This 30 point total has flexibility built in because you are allowed to miss 9 points during the semester without any impact on your grade.

- Example calculation #1: Marlene completes all posts (13 weeks) for 26 points and 5 responses for 5 points, thus her total is 31 points. Her final score is 100% because 31 is greater than 30. (Note: There are several weeks she did not need to respond.)
- Example calculation #2: Marlene completes 10 posts (10 weeks) but receives 18 points (out of 20) because a few of her responses were superficial. At the same time, Marlene completes 12 responses for 12 points (5 responses in Weeks 1-7 & 7 responses in Weeks 8-13). Thus, her total is 30 points out of 30 and she achieves a 100%. Note: In this scenario, Marlene made up a few forum points in Weeks 8-13.

Homework - Mastering Chemistry (10%):

Purpose: To learn, we must practice and this practice should be regular, spaced out, require effort and provide room to make mistakes without impact on the grade. These homework assignments will help you practice the concepts as you work to meet the learning objectives.

Details:

- These homework assignments will be available through Pearson's web-based app called Mastering Chemistry. Access to this app is required (see instructions on Moodle) and there is a cost associated with it, but I (and the students) believe the learning benefits outweigh the cost. Please reach out to me if this cost is a problem for you. Note: Paying for access to Mastering Chemistry also gives you access to the digital textbook, which some students find helpful.
- There are 13 assignments and they start Week 1 and end Week 13. Each one will be available Tuesday morning and due at 11:59 pm the following Sunday.
- You will have five attempts to complete the assignment and Mastering Chemistry will keep your highest score. Note: You will need to complete the quiz before you can restart AND there is a deduction for each incorrect answer.
- At the end of the semester, I will calculate your grade by averaging your highest 10 homework scores. Note: This means everyone can miss 3 homework assignments.

Exams (60%):

Purpose: In order to complete complex cognitive tasks that rely on biochemistry concepts, these concepts must be part of your memory. Unit exams provide opportunities for you to demonstrate what knowledge is part of your working memory and how you apply and make connections between concepts.

Details:

- There will be four exams over the semester, each worth 15%. Exams will use the Online Web-based Learning (OWL) platform and take place in the Integrated Science Building (ISB) at the following dates and times.
 - Exam 1: Wednesday, March 1 at 6 or 7:30 pm
 - Exam 2: Wednesday, March 29 at 6 or 7:30 pm
 - Exam 3: Wednesday, April 26 at 6 or 7:30 pm
 - Exam 4: TBD
- Students with accommodations may choose to take the exam earlier in the day at Disability Services or in ISB at 6 pm. If the student has a time extension, it will be programmed into OWL.
- The 75 minute exams will include multiple choice, True/False, fill-in-the-blank, and short answer questions. Each exam is partly cumulative since the concepts in each unit build on the ones from the previous unit(s).
- A full credit make-up exam will be allowed only if the instructor is contacted before the start time; days and times for make-up exams are predetermined.
- At the end of the semester, the lowest exam grade will be replaced by the average of your highest and lowest exam grades. For example, if your low score was a 45% on Exam 2 and your high score was a 83% on Exam 4, then the average of these two scores is 64%. Thus, your score on Exam 2 will be replaced by the 64%.

Extra Credit:

Four extra credit opportunities will be available during the semester. Three of these are exam reflections and the fourth is the end-of-course survey. Each one has a maximum value of 0.3 percentage points towards your final grade. Additional details will be provided as each assignment becomes available.

Final Grading Scale:

Final grades are rounded to the tenth and then assigned according to this scale.

A	93.00 – 100.00%	B-	80.00 – 82.99%	D+	67.00 – 69.99%
A-	90.00 – 92.99%	C+	77.00 – 79.99%	D	60.00 – 66.99%
B+	87.00 – 89.99%	C	73.00 – 76.99%	F	<59.99
B	83.00 – 86.99%	C-	70.00 – 72.99%		

Course Communication, Student Hours, and Other Support

Instructor information:

Name: <PROF_FULL_NAME>, Ph.D., please call me "Professor <PROF_LAST_NAME>"

Office: Department of Biochemistry and Molecular Biology, LGRT 913G

E-mail: <PROF_EMAIL>

Student hours:

These are times I set aside for everyone. Come as a group, come as an individual, bring your biochem questions – something troubling you from class or a curiosity question, bring your career questions, bring a philosophical idea you want to discuss, etc. In other words, simply be yourself and bring yourself! Stay for 10 minutes or stay for the whole time, whatever fits your schedule. If you need to discuss a personal situation, please contact me to schedule a meeting outside these regular hours.

- Thursdays 10:15 am – 12 noon (in person)
- Thursdays 3 – 4:30 pm (virtual by Zoom)

*Adjustments will be made to avoid conflicts with SI sessions and additional hours will be offered as needed.

Course Communication:

To help keep everyone aware of deadlines and planned activities, I will send email announcements out once per week (through Moodle) and highlight important reminders during class. You can email me with your questions (I aim to reply within 24 hours on weekdays, and 48 hours on weekends), or post your questions to the Question and Answer (Q&A) forum on Moodle. This forum is set up so that anyone may post (or reply to) a question.

Supplemental Instructor (SI) information:

The role of an SI Leader is to attend class and hold two 75-minute learning review sessions per week. The SI Leader also holds an exam review session before each midterm or final exam. This person is an undergraduate student who has previously excelled in the course. SI contact information and session schedules will be posted to Moodle within the first two weeks.

Teaching Assistant (TA) information:

There are multiple undergraduate TAs and one graduate TA who will assist this semester. The undergraduate TAs will facilitate class activities, assist with Zoom,

lead peer discussion sessions, moderate the discussion forums, and proctor exams. Some undergraduate TAs will also be available for one-on-one tutoring. Contact information and TA roles (i.e., who moderates which forum and who can tutor) will be posted to Moodle.

Additional Support

Many support services are offered by the University.

- Advising in CNS: information and appointments
- <https://www.cns.umass.edu/advising/advising-appointments>
- Dean of Students Office - https://www.umass.edu/dean_students/
- UMass Libraries - <https://www.library.umass.edu/>
- Learning Resource Center - <http://www.umass.edu/lrc>
- Student Success - <https://www.umass.edu/studentsuccess/>
- CNS Office of Student Success and Diversity
- <https://www.cns.umass.edu/students/student-success-and-diversity>
- CMASS Success Coach Program - <https://www.umass.edu/cmass/get-involved/success/academic-support>
- CNS Career and Professional Development Center
- <https://www.cns.umass.edu/advising/cns-career-center>
- SPHHS Office of Career Planning - <https://www.umass.edu/sphhs/careers>
- Center for Counseling and Psychological Health (CCPH) - <http://www.umass.edu/counseling>
- Center for Women and Community - <https://www.umass.edu/cwc/>
- English as a Second Language (ESL) Program - <http://www.umass.edu/esl>
- Assistive Technology Center - <https://www.umass.edu/it/assistive>
- Disability Services - <https://www.umass.edu/disability/>
- Single Stop Resources - <https://www.umass.edu/studentlife/single-stop>

UMass and BIOCHEM 320 Course Policies

Public Health statement (COVID-19, etc.):

Everyone must follow [current University public health guidelines](#). Regardless of your illness, please do not come to class if you are feeling unwell. The attendance component is structured to allow flexibility and some absences without penalty or loss in credit (see Attendance section). If your illness or situation leads to an extended absence, please schedule a meeting with me to discuss different accommodations.

Missed or late work or extensions:

Weekly assignments are always due Sunday night by 11:59 pm, even if it is a holiday weekend. This consistency is important. Any changes I make will be announced in class and through Moodle. Flexibility to miss some assignments and classes are built into the course and should cover most circumstances, but if you have an unexpected situation or assignment extensions are part of your accommodations, contact me as soon as possible to discuss an extension. Note: Because of the course flexibility, extension requests should be infrequent.

Student Learning Accommodations:

As a member of the university, I am committed to providing an equal educational opportunity for all students. If you have a documented disability, you may be eligible for reasonable academic accommodations to help you succeed in this course. Please make sure I receive official documentation detailing your required accommodations. If you would like to discuss your circumstances in more detail, please contact me and we will find a time that works for both of us. Office of Disability Services: <http://www.umass.edu/disability/>

Academic Honesty / Code of Student Conduct:

Please remember students are obligated to demonstrate academic honesty at all times. Violations of academic honesty include, but are not limited to, plagiarism, fabrication, cheating, and facilitating dishonesty.

IMPORTANT: Students are not permitted to post, publish, or sell course materials in any form to any entity (such as Chegg, CourseHero, etc.) during and after completion of Biochem 320. These actions are violations of both University policies and federal copyright laws. Course grades are determined in part by adherence to assignment guidelines and rubrics, so the sharing of these materials is also considered cheating. Violation of this rule constitutes [academic dishonesty](#), which is prohibited by the [Code of Student Conduct](#), and subject to disciplinary action.

Religious Holidays: University members have the right to practice the religion of their choice. Please contact me as soon as possible if there will be any absences as a result of religious observance.

COURSE SCHEDULE ON THE FOLLOWING PAGES...

BIOCHEM 320 Class Schedule Spring 2023

Important UMASS dates:

Feb 13:	Last day to add/drop any class with no record
Mar 12-19:	Spring break
Apr 10:	Last day to drop with "W" or Select Pass/Fail
Apr 15-18:	April vacation (Patriot's day)
May 17:	Last day of classes
May 19:	Final Examinations begin

NOTE: I may modify this schedule as necessary to reach student learning goals or accommodate cancelations due to weather.

Event	Topics	Due on Sunday
Week 1: Feb. 6-12	<ul style="list-style-type: none"> Welcome and Course Structure Molecular interactions in a cellular environment 	<ul style="list-style-type: none"> Mastering Homework #1 Moodle Forum #1 post & reply Asynchronous questionnaire
Week 2: Feb. 13-19	<ul style="list-style-type: none"> Dependence of protein function on amino acid properties <p>* Attendance counts starting this week</p>	<ul style="list-style-type: none"> Mastering Homework #2 Moodle Forum #2 post & reply Asynchronous questionnaire
Week 3: Feb. 20-26	<ul style="list-style-type: none"> Relationship between amino acid sequence & proximity to protein structure 	<ul style="list-style-type: none"> Mastering Homework #3 Moodle Forum #3 post & reply Asynchronous questionnaire
Week 4: Feb. 27- Mar. 5 EXAM 1 this week!	<ul style="list-style-type: none"> Review Connections between proteins - enzymes, free energy and cellular reactions Exam #1 covering Weeks 1-3 on Wednesday, March 1 in ISB 155-160 (either 6 OR 7:30 pm) 	<ul style="list-style-type: none"> Mastering Homework #4 Moodle Forum #4 post & reply Asynchronous questionnaire
Week 5 & Spring	<ul style="list-style-type: none"> How enzymes work Dependence of enzyme function on amino acid properties 	<ul style="list-style-type: none"> Mastering Homework #5 Moodle Forum #5 post & reply

Break: Mar. 6-19		<ul style="list-style-type: none"> Asynchronous questionnaire Exam 1 Reflection (optional and extra credit)
Week 6: Mar. 20-26	<ul style="list-style-type: none"> Controlling enzyme activity and rates of chemical reactions 	<ul style="list-style-type: none"> Mastering Homework #6 Moodle Forum #6 post & reply Asynchronous questionnaire
Week 7: Mar. 27- Apr. 2 EXAM 2 this week!	<ul style="list-style-type: none"> Review Relationships between metabolism and energy transfer Exam #2 covering Weeks 4-6 on Wednesday, March 29 in ISB 155-160 (either 6 OR 7:30 pm) 	<ul style="list-style-type: none"> Mastering Homework #7 Moodle Forum #7 post & reply Asynchronous questionnaire
Week 8: Apr. 3-9	<ul style="list-style-type: none"> Carbohydrate structure and metabolism 	<ul style="list-style-type: none"> Mastering Homework #8 Moodle Forum #8 post & reply Asynchronous questionnaire Exam 2 Reflection (optional and extra credit)
Week 9: Apr. 10-16	<ul style="list-style-type: none"> Carbohydrate metabolism 	<ul style="list-style-type: none"> Mastering Homework #9 Moodle Forum #9 post & reply Asynchronous questionnaire
Week 10: Apr. 17-23 (Tuesday vacation)	<ul style="list-style-type: none"> Carbohydrate metabolism and energy yield 	<ul style="list-style-type: none"> Mastering Homework #10 Moodle Forum #10 post & reply Asynchronous questionnaire
Week 11: Apr. 24-30 EXAM 3 is this week!	<ul style="list-style-type: none"> Review Lipid structure and metabolism Exam #3 covering Weeks 7-10 on Wednesday, April 26 in ISB 155-160 (either 6 or 7:30 pm) 	<ul style="list-style-type: none"> Mastering Homework #11 Moodle Forum #11 post & reply Asynchronous questionnaire
Week 12: May 1-7	<ul style="list-style-type: none"> Lipid metabolism and energy yield Principles of metabolic control 	<ul style="list-style-type: none"> Mastering Homework #12 Moodle Forum #12 post & reply

		<ul style="list-style-type: none"> Asynchronous questionnaire Exam 3 Reflection (optional and extra credit)
Week 13: May 8-14	<ul style="list-style-type: none"> How is carbohydrate energy transfer controlled? 	<ul style="list-style-type: none"> Mastering Homework #13 Moodle Forum #13 post & reply Asynchronous questionnaire
Weeks 14 & 15: May 15-25 EXAM 4 is TBD!	<ul style="list-style-type: none"> How is lipid energy transfer controlled? Exam #4 covering Weeks 11-14 on XXX in ISB 155-160 (time and date are TBD) 	<ul style="list-style-type: none"> Forward Focus course survey (optional & extra credit)

This document was last updated on 2/2/2023.