Introduction to Biochemistry and Molecular Biology
BCMB / BIOL / CHEM 3100 (39118)

Tuesdays 2:20-3:35 pm and Thursdays 12:45-2 pm and 2:20-3:35 pm
Hardman Hall Room 102

INSTRUCTORS

Dr. Erin Dolan
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Office hours Thursdays 11 am-12 pm
or by appointment

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Office hours Mondays 11 am-12 pm
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Greetings and welcome to 3100!

This course is designed to help you learn how to:

- Explain how macromolecules (proteins, nucleic acids, carbohydrates, lipids) are synthesized and metabolized.
- Explain the relationship between macromolecular structure and function.
- Explain how enzymes function, including their mechanisms and regulation.
- Explain the energetics of biochemical reactions.
- Explain the idea of "flux" and its relationship to the function and regulation of metabolic pathways.
- Predict how chemical and physical parameters affect biological processes.
- Apply the knowledge above to solve biochemical problems.
- Apply the knowledge above to analyze, interpret, and evaluate biochemical data.

The course will be taught by two different instructors using a variety of different teaching methods, mostly centered around real biochemical cases, problems, and scenarios that you will learn about and analyze in order to learn biochemistry and molecular biology. Our aims are to:

- Help you gain **new knowledge** about biochemistry and molecular biology through readings and lectures;
- Help you develop **new thinking skills** by applying your new knowledge to answer questions, analyze scenarios, and solve problems either during class or on homework assignments; and
- Share what they find **fun, interesting, and exciting** about biochemistry and molecular biology in the hopes that you find it fun, interesting, and exciting, too.

PREREQUISITES

In this course, we will assume you have completed the following prerequisites: BIOL 1107 and 1107L and CHEM 2211 and 2211L or their equivalents.

COURSE RESOURCES

- **Notes, powerpoints, cases, and problems from class**. These will be posted on eLC. It is your responsibility to make sure you have access to the eLC site. Please email Dr. Dolan from your UGA email account if you need to be enrolled.
- **Textbook**: ***Biochemistry – A short course*, 4th edition (Tymoczko, Berg, Gatto, Stryer).** If you choose to use a previous edition, you are responsible for determining the assigned readings. https://www.macmillanlearning.com/college/us/product/Biochemistry-A-Short-Course/p/1319114636

COURSE ORGANIZATION AND DESIGN

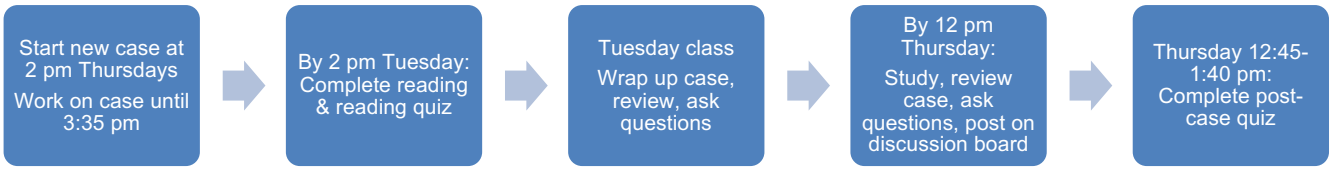
The course is divided into four major content areas, which we call units. Each unit will span three to four weeks for a total of 15 weeks plus a final exam:

Unit	Unit Dates
Introduction	Aug 19
Unit 1. Protein structure and function[1]	Aug 19-Sept 16
Unit 2. Carbohydrate metabolism part 1[1]	Sept 16-Oct 7
Unit 3. Carbohydrate metabolism part 2[2]	Oct 7-Oct 28
Unit 4. Nucleic acids, proteins, and metabolism[2]	Oct 28-Nov 30
Last day of class – nerdy biochem fun!	Dec 2
Final Exam[3]	

[1] Dr. Dolan will teach these units. [2] Dr. Urbanowicz will teach these units. [3]A cumulative, multiple-choice, online final exam will be held during exam period (date and time to be determined).

Each of the 14 weeks will follow a similar pattern that starts on Thursdays:

- Introduction to a case or problem on Thursdays starting at 2 pm
- A case or problem set that we will work on during the class on Thursday and the following Tuesday using a google doc (links to be posted in eLC).
- A reading and a reading quiz to be completed by 2 pm Tuesdays.
- A discussion board for posting questions and responses to prompts about course materials to be completed by 12 noon Thursdays.
- A post-case quiz held Thursdays 12:45-1:40 pm (followed by a 20 minute break before starting the next case at 2 pm.



Honors option: Please contact the instructors for information about the Honors Option.

COURSE ACTIVITIES AND GRADING

Our course will involve four types of activities plus an optional final exam:

1. **Reading quizzes**. There will be 14 reading quizzes that you will complete on eLC. Each will include 5-10 multiple choice questions. The quizzes must be completed on Tuesdays BEFORE class on eLC. **Each quiz will be worth 10 pts. Only 13 will count toward your grade; you can miss one (1) and still earn full credit (130 pts).** You will be most successful in this class if you complete all of the readings and quizzes.
2. **Cases and assignments.** There will be 14 assignments, such as cases, problem sets, or paper reading, which will require you to apply knowledge you have gained from textbook readings and class discussion to real-life scenarios. The assignments will require you to understand and use biochemical concepts, rather than simply memorizing facts. We will work through the cases both during and outside of class time. You will NOT be expected to turn them in, but rather to use them to learn the material and show that you have learned on the post-case quiz.
3. **Discussion board posts.** You will make posts or respond to prompts each week on eLC discussion boards. There will be 14 opportunities to post or respond to a prompt, one each week. Discussion boards will open after class on Tuesday and you should complete your weekly post by 12 noon on Thursday. **Each post will be worth 5 pts. Only 13 will count toward your grade; you can miss one (1) and still earn full credit (65 pts).** You will be most successful in this class if you complete all of the posts.
4. **Post-case quizzes.** There will be 14 post-case quizzes, one after each case. Each quiz will include a few multiple choice questions or problems and one or two short-answer questions or problems that reflect the kinds of problems we want you to be able to solve after completing each case. The post-case quizzes will be held 12:45-1:40 pm each Thursday. **Each quiz will be worth 25 pts. Only 13 will count toward your grade; you can miss one (1) and still earn full credit (325 pts).**
5. **Final exam:** The final exam is optional. If you choose to take the final, it will replace your three lowest post-case quiz scores. It will be cumulative and all multiple-choice: **40 questions total with 10 questions per unit (75 pts.).**

You will earn points in the course like this:

Activity	Points	% of final grade
Reading quizzes	130 pts (10 pts each for 13 of 14 quizzes)	25%
Discussion board posts	65 pts (5 pts each for 13 of 14 posts)	12.5%
Post-case quizzes	325 pts (25 pts each for 13 of 14 quizzes)	62.5%
Total	**520 points total**	**100%**

Final grades will be assigned like this:

Grade Earned	Points	Approximate Percentage	Grade Earned	Points	Approximate Percentage
A	483	>93%	C+	400-415	79-77%
A-	468-482	92-90%	C	364-399	76-70%
B+	452-467	89-87%	D	312-363	69-60%
B	431-451	86-83%	F	<312	<60%
B-	416-430	82-80%			

HOW TO BE SUCCESSFUL IN THIS COURSE

To be successful in this course, we encourage you to:

- **Complete the assigned readings, then treat the textbook as a reference**. Do not just read the textbook over and over again – this is NOT a helpful way to study. Instead, focus on the solving the cases and problems from the assignments, responding to questions from class, and responding to discussion board prompts. Consider how you might alter a case or problem, and how the altered version could be solved.
- **Focus on the learning objectives**. Each week will have an associated set of learning objectives – this you should be able to do if you understand the material. The post-case quizzes will assess your accomplishment of the learning objectives. Use the learning objectives as a guide for what to focus on when you are completing assignments and studying for quizzes. Practice doing the learning objectives, rather than simply reading them.
- **Not spend time memorizing.** You can look up facts when you are working on assignments. Some facts (e.g., amino acid structures) will be provided for you on quizzes so that you can focus on applying knowledge rather than just regurgitating facts. You will come to remember the most important facts as you practice solving problems.
- **Actively engage during class, on google docs, and on discussion boards.** It is important to remember that the brain that does the work does the learning!
- Study with classmates, including working on cases and problems together either in person or using distance communication tools (Facetime, Zoom, Skype, WhatsApp, GroupMe, etc). **You must submit all work in your own words**, but you should feel free to collaborate with classmates to understand key concepts behind the cases and problems.

Education research has demonstrated that the more opportunities students have to verbalize their thinking either in writing or aloud, the more students learn. Education research has also shown that when instructors prompt students with questions, rather than giving explanations themselves, students learn more. Thus, the course is designed to maximize your opportunities to explain your thinking to yourself, to your classmates, and to us. We know that this will be more challenging this semester, as we will be spatially separated, but we have designed the format of the class to maximize engagement and communication regardless of whether we are in-person, online, synchronous, or asynchronous. As a result:

- You will be able to figure out what you don't know and study accordingly.
- The instructors will be able to figure out what you don't know and tailor future instruction accordingly.
- You will be better prepared to solve problems both on post-case quizzes and throughout life, especially if you pursue a career involving science or evidence-based decision making.
- You will bond together over the good and bad of Zoom meetings, and maybe meet a few of your classmates' pets along the way!

We will make active use of google docs to work through cases. We will provide instructions for how to use the google docs when we work on our first case. We will also make active use of the discussion board function on eLC. We will have regular prompts and questions for you to respond to on the discussion board, but you are encouraged to post questions you have about course content and to respond to your classmates' questions. We will check both google docs and discussion boards on daily

basis during business hours (i.e., 9 am-5 pm Monday through Friday) to questions or topics posted on the Discussion Board, and strongly encourage you to respond to your classmates' posts. No student will be penalized for posting an incorrect idea – you should consider this a safe venue for articulating and checking your thinking. If you are interested in a career in the allied health professions (physician, dentist, nurse, physician's assistant, etc.), this is a place for demonstrating your ability to interact with others in ways that are respectful, empathetic, and informed.

In posting to the Discussion Board, please adhere to UGA's Code of Conduct (http://conduct.uga.edu/code_of_conduct/index.html) by following these rules:

- **Treat everyone with respect:** Disagreements are fine, but the discussion should not get personal. There is a big difference between "I think you're wrong" and "I think you're an idiot" (or worse). Please keep your posts civil.
- **Stay on topic:** Discussions can meander, but the point of this Discussion Board is to discuss biology (not your plans for the weekend). Please keep your posts related to the content of the course. Off-topic posts may be moved or deleted without notice.
- **Stay within the boundaries:** You may not post messages that are illegal, harassing, intimidating, defamatory, profane, or indecent. Never say something on the Discussion Board that you wouldn't say in front of a group of people or face-to-face.
- **No UGA website can be used for advertising:** This means that you are not allowed to sell your notes or post URLs for note-taking, tutoring, or other products or services on eLC.

OTHER COURSE INFORMATION

Communication: To comply with the Family Educational Rights and Privacy Act (FERPA), all communication that refers to individual students must be through a secure medium (UGAMail, eLC, zoom meeting) or in person. Instructors are not allowed to respond to messages that refer to individual students or student progress in the course through non-UGA accounts, phone calls, or other types of electronic media.

Absences: We have designed the course to minimize the impact of absences. For instance, you can miss a quiz and a discussion board post and still earn full credit in the course. You can also choose to take an optional final exam to replace your three lowest post case quiz scores. If you are going to miss a quiz or discussion board post due to illness, authorized representation of the University, or extraordinary personal circumstances, please notify the instructors as soon as possible so we can figure out a reasonable way for you to make up the work and stay up-to-speed on class material. **If you are ill or have been exposed to someone with COVID-19, please DO NOT COME TO CLASS. Please email the instructor and we will provide a zoom link for you to join class / a zoom recording of the class.** Unexcused late submissions won't be accepted and will result in a score of zero (0) for that quiz or post.

Academic Honesty and the Honor Code: As a University of Georgia student, you have agreed to abide by the University's academic honesty policy, "A Culture of Honesty," and the Student Honor Code. All academic work must meet the standards described in "A Culture of Honesty" found at: www.uga.edu/honesty. Academic work includes, but is not limited to, course assignments, reading

quizzes, case studies, exams, in-class questions, and course evaluations. Lack of knowledge of the academic honesty policy is not a reasonable explanation for a violation. Questions related to course assignments and the academic honesty policy should be directed to the instructor**.** ***More specifically, this means the following examples are violations of the policy, and you WILL NOT:***

1. Post academic work to a text message, website (Course Hero, Koofers, etc.), electronic media, or physical space.
2. Copy someone else's academic work or sharing your academic work with others.
3. Complete academic work for someone else.
4. Look at another person's exam while taking an exam.

NOTE: You are allowed to share your personal course notes if you would like to.

Participation: The course content and discussions will be tailored to build on your existing knowledge and address your questions and concerns, so your active participation during class sessions is essential. There will be times you will have to miss class because of an emergency or other professional or educational commitment. We have structured the grading in this course to minimize the impact of missing a class for legitimate reasons. Please contact classmates to get up to speed on what you missed.

Disability Accommodations: Reasonable accommodations are available for students who have a disability. The Disability Resource Center in the Division of Student Affairs (https://drc.uga.edu/ **note:** this website doesn't work on Chrome so you will need to use another browser; 114 Clark Howell Hall; 706-542-8719 voice; 706-542-7719 fax; 706-542-8778 tty) coordinates accommodations and services for students with disabilities. Please notify the instructors of any accommodations needed for the course.

Technology: We will spend time working in class on cases and problem sets and accessing information on Wikipedia, PubMed, Web of Knowledge, or eLC during class. Thus, it will be very helpful to bring a laptop or tablet to class. If this is not possible, we encourage you to download and print hard copies of the cases and problem sets to work on during class. Please be sure **your use of technology is on task so you can focus on the course material and avoid distracting classmates or yourself. If you need any help getting suitable technology, please let us know so we can help!**

Tutoring: The Academic Resource Center offers academic support for a range of science courses, including BCMB 3100. For information on resources and tutoring, visit their website at: https://dae.uga.edu/services/tutoring/.

Mental Health and Wellness Resources:

- If you or someone you know needs assistance, you are encouraged to contact Student Care and Outreach in the Division of Student Affairs at 706-542-7774 or visit https://sco.uga.edu. They will help you navigate any difficult circumstances you may be facing by connecting you with the appropriate resources or services.
- UGA has several resources for a student seeking mental health services (https://www.uhs.uga.edu/bewelluga/bewelluga) or crisis support (https://www.uhs.uga.edu/info/emergencies).

- If you need help managing stress anxiety, relationships, etc., please visit BeWellUGA (https://www.uhs.uga.edu/bewelluga/bewelluga) for a list of FREE workshops, classes, mentoring, and health coaching led by licensed clinicians and health educators in the University Health Center.
- Additional resources can be accessed through the UGA App.

CORONAVIRUS INFORMATION

- Up-to-date information for UGA is here: https://coronavirus.uga.edu/
- Information from the CDC is here: https://www.cdc.gov/coronavirus/2019-ncov/index.html
- CDC county-level data are here: https://covid.cdc.gov/covid-data-tracker/
- Georgia COVID Dashboard is here: https://dph.georgia.gov/covid-19-daily-status-report (note scroll down & wait for the data to load)

Vaccinations

As of late July 2021, >97% of hospitalizations and >99% of deaths from COVID-19 are among the unvaccinated. The delta variant (now dominant in late July 2021) is far more transmissible and virulent than the original Wuhan strain. All COVID-19 vaccines are effective against all variants (so far). Previous infection may not provide protective immunity against new variants.

Vaccines are safe, effective, and protect not just those who are vaccinated, but also people with compromised immune systems (including pregnant women) and members of the community, including children too young to be vaccinated. This is true for ALL FDA approved vaccines (not just COVID-19). Vaccines are available from your doctor, most local health departments, and many pharmacies. The USG policy on vaccinations is here: https://www.usg.edu/policymanual/section4/C334/

You can receive FREE COVID-19 vaccinations at the University Health Center: https://www.uhs.uga.edu/healthtopics/covid-vaccine

COVID Testing

If you have symptoms - schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5 p.m.). **Do Not Walk In!** Call first. If you do not have symptoms access the Surveillance Testing: https://clia.vetview.vet.uga.edu/

Report Positive COVID test on DawgCheck

If you are diagnosed with COVID, you are required to report it here: https://dawgcheck.uga.edu/. You are also encouraged to perform a quick symptom check prior to coming to campus each day and reporting any symptoms or exposures on DawgCheck. Continued use of DawgCheck will help health providers monitor the health situation on campus.

If you have symptoms: Isolate & Get Tested

Students showing symptoms of COVID or any other infectious disease should self-isolate and schedule an appointment with the University Health Center by calling 706-542-1162 (Monday-Friday, 8 a.m.-5 p.m.). **Please DO NOT walk-in.** If you have trouble breathing seek immediate care. For emergencies and after-hours care, see https://www.uhs.uga.edu/info/emergencies. You should remain isolated for 10

days following the onset of symptoms. If symptoms persist beyond 10 days, then remain isolated at least 24 hours after the last symptoms subside.

If you have been exposed: Quarantine

Vaccinated students who have been exposed to anyone testing positive for COVID-19 do not need to self-isolate (quarantine), but may do so, especially if the exposure was significant (≥30 minutes without masks and <6 feet of separation or farther if singing, cheering, yelling, etc.).

Unvaccinated students who have been exposed to anyone testing positive for COVID-19 **are required to** self-isolate (quarantine) and should also get tested (see Testing section above). Testing can help determine if you have COVID-19 but are asymptomatic or pre-symptomatic. Most people will develop symptoms within 3-7 days following exposure, thus strict quarantine for 7 days and testing at day 7 is the most valuable. If you test negative after day 7, you are released from home quarantine, but you should monitor symptoms for up to 14 days. If you develop symptoms or test positive, see the section above on Isolating.

Face Coverings & Social Distancing

Because SARS-CoV-2 is transmitted through aerosols, masking is an efficient method of reducing transmission. Currently, N-95 masks are generally available and their use is encouraged for those at highest risk for COVID-19.

Currently, the University of Georgia—along with all University System of Georgia (USG) institutions— recommends that all faculty, staff, students and visitors wear an appropriate face covering while inside campus facilities/buildings where six feet social distancing may not always be possible. Additional mask requirements may be instituted due to specific situations within individual courses and/or may change during the course of the semester in response to pandemic conditions.

Vaccinated students are encouraged to wear cloth masks indoors, but may remove them for indoor classroom activities, as directed by the instructor. Social distancing is not required or recommended.

Unvaccinated students should wear N-95 or double (i.e., cloth over surgical) masks when indoors. These masks should not be removed when indoors. Social distancing is recommended.

Hand and Surface Sanitizing, Physical Barriers

Minimizing exchange of germs on hands or surfaces commonly in contact with hands (e.g., door handles) is good public health practice, but extreme measures, especially for the vaccinated, are not warranted.