

Molecular Biology and Biochemistry

694:407/115:511

Fall 2024

Instructors and Contact Information

The best way to contact us is via email. We will reply within 1 business day, not including weekends or holidays.

Instructor	Email	Student Support Hours and Location
Kevin Monahan (Coordinator)	km1339@dls.rutgers.edu	TBD
Tina Liu	tina.liu@cabm.rutgers.edu	TBD
Yang Lyu	yang.lyu@rutgers.edu	TBD
TA - TBD		

Course Information

- Lectures will be held **in person** on Mondays and Wednesdays from 2:00 to 3:30 PM in [Tillet Hall - Room 254](#) on the Livingston campus.
- All grades and assignments will be posted on Canvas. Our course site is: **TBD**

Course Description

This course is the first part of a two-semester sequence offered as the primary foundation course for students interested in pursuing modern molecular biology. This semester (01:694:407) provides a complete survey of Biochemistry topics, and the second semester (01:694:408) provides a thorough coverage of current ideas in Molecular Biology.

Prerequisites

Organic Chemistry 01:160:209 or 01:160:307 or higher. Credit not given for both 01:694:407 and 01:694:301, 11:115:301 or 11:115:403.

Learning Goals

1. Students should demonstrate an understanding of the knowledge that is needed to begin biomedical research and that is required for post-graduate exams and studies.
2. Students should demonstrate the ability to find and evaluate information about specific biological systems or problems.
3. Students will understand how energy is derived from fuels in biological systems
4. Students should demonstrate the ability to link together the different metabolic processes and understand how they regulate each other and function cooperatively
5. Students will understand how genetic information is propagated, maintained, and utilized to facilitate biological functions
6. Students will understand how cells are able to regulate the import and export of biomolecules, why this occurs, and how

Required Text

Principles of Biochemistry 8th Ed., Lehninger, Nelson & Cox - ISBN: 9781319230906 (Achieve)

All students in the class will be automatically enrolled in the First Day program from MacMillan. This will give you the eBook version of the textbook and access to additional required online resources on the MacMillan Achieve site.

Assignments

Your grade will be based upon four exams (20% each, 80% total), online adaptive quizzes taken before each lecture (10% total), and weekly homework assignments on Canvas (10% total).

Exams (80%)

There will be four exams covering blocks of material as indicated on the syllabus. The exams will primarily test the material covered in each block, but you will also be expected to retain the core concepts covered earlier in the course. Exams will be administered in-person during regularly scheduled class time, except for the fourth exam, which will be given during the final exam period. The fourth exam is otherwise a normal exam. Exams will consist of multiple choice, fill in the blank questions, and open-ended questions.

Adaptive Quizzes (10%)

Before each lecture, you must complete an adaptive quiz based on the assigned reading. The adaptive quizzes are taken through the Achieve website and will be linked on Canvas. You will receive full credit (5 points) if you complete the quiz. Late submissions are allowed, but they will receive a 20% penalty per day.

Homework (10%)

Most weeks there will be a homework assignment, in the form of a Canvas quiz, that will be due at 11:59 pm on Thursday. Late homework will not be accepted. These assignments are intended to give you additional practice answering questions and solving problems based on the recent lectures. You may use your notes and textbook to answer the questions, as well as work together with other students. The number of questions assigned will vary from week to week. Your final homework grade will be calculated by adding together the points you received on each assignment and then dividing by the total number of points possible.

Extra credit

Extra credit MAY be assigned during the semester at the discretion of the instructors. Any extra credit opportunities will be presented to the class as a whole. No individual extra credit will be assigned. No extra credit will be assigned after the 4th exam. Extra credit points gained through these assignments will be awarded in the form of extra points on an exam.

Grading Policy

After each exam, we will send the class relevant details about class averages including mean, median and distribution. We will not, under any circumstances, answer questions regarding grade cutoffs. Final grades will be rounded to the nearest whole number. For example, 89.50 will round up to a 90. An 89.49 will round down to an 89. We will not be calculating grade cutoffs until after the final exam. If a curve is required, it will be determined at the end of the semester.

Grading-related questions must be asked within one week of receiving an assignment grade. Graded exams will be retained by the instructor, if you wish to review your exam you must schedule a time to do so. After one week has passed, assignment grades will be locked; this prevents a tsunami of regrade requests during the last week of the semester. If we do find a mistake in grading, we will fix the error and update grades on Canvas accordingly.

Attendance and Makeup Policy

Students are expected to attend all lectures in-person. For short absences (one or two lectures), you should complete the University Self-Reporting Form (<https://sims.rutgers.edu/ssra/>).

If you are going to have an extended absence (three or more lectures), you should contact the dean of students (deanofstudents@echo.rutgers.edu) to obtain an absence verification notice (AVN) that documents the reason for your absence.

If you are unable to take an exam at the scheduled time, you must let the course coordinator know as soon as possible. If you miss an exam without advanced notice, you must contact the coordinator within 24 hours to arrange a makeup. Trips and travel are not acceptable reasons for missing an exam. Acceptable reasons for missing an exam include illnesses and other emergency situations. In these situations, you must contact the dean of students (deanofstudents@echo.rutgers.edu) to obtain an absence verification notice (AVN) that documents the reason for your absence. When you contact the Dean of Students, make sure to indicate that your absence resulted in missing an exam.

If an exam is missed for an acceptable reason, there will be no score penalty and we will make reasonable accommodations to allow you to take a makeup exam. If no acceptable reason exists for missing the exam, a twenty point penalty will be applied to your exam score AND you will be required to complete a makeup within three days of the exam date. No makeup will be given for the final exam except when required by the dean's office.

Lecture Recordings

We try to record every lecture. However, you should not count on these recordings because they can fail for various reasons. In order to encourage attending lectures in person, we will typically only make lecture recordings available a day or two before the corresponding exam, when they should be used for review purposes. Students who miss a lecture and report their absence through the self-report system will be given early access to a lecture recording, if one is available.

Course Schedule (2024)

Week	Date	Day	Lecturer	Chapter	Topic
1	9/3	Tuesday	Liu	1	Foundations of Biochemistry
	9/6	Friday	Liu	2	Water (pH and buffers)
2	9/10	Tuesday	Liu	3.1, 3.2, 3.4	Amino Acids, Peptides, and Proteins
	9/13	Friday	Liu	4.1-4.4	Protein Structure and Folding
3	9/17	Tuesday	Liu	3.3, 4.4-4.5	Protein Misfolding and Disease; Research Methods
	9/20	Friday	Liu	5	Protein Function
4	9/24	Tuesday	Liu	6	Enzymes
	9/27	Friday			EXAM 1
5	10/1	Tuesday	Liu	7	Carbohydrates
	10/4	Friday	Liu	8	Nucleotides & Nucleic Acids
6	10/8	Tuesday	Liu	10	Lipids
	10/11	Friday	Liu	11	Membranes and Transport
7	10/15	Tuesday	Liu	12	Biochemical Signaling
	10/18	Friday			EXAM 2
8	10/22	Tuesday	Monahan	13	Introduction to Metabolism
	10/25	Friday	Monahan	14.1-14.3	Glycolysis
9	10/29	Tuesday	Monahan	14.4-14.6	Gluconeogenesis & Pentose Phosphate Pathway
	11/1	Friday	Monahan	15	Glucose and Glycogen
10	11/5	Tuesday	Lyu	16	Citric Acid Cycle
	11/8	Friday	Monahan	17	Lipid Metabolism (catabolism, ketogenesis)
11	11/12	Tuesday	Lyu	18	Amino Acid Catabolism & Urea Cycle
	11/15	Friday			EXAM 3
12	11/19	Tuesday	Monahan	19	Electron Transport Chain, Oxidative Phosphorylation
	11/22	Friday	Monahan	20.1-20.3	Photosynthesis Part 1
13	11/27	Wed.	Monahan	20.4-20.6	Photosynthesis Part 2
14	12/3	Tuesday	Monahan	21	Lipid Biosynthesis
	12/6	Friday	Monahan	22.1 -22.3	Amino Acid Biosynthesis
15	12/10	Tuesday	Monahan	22.4	Nucleotide Metabolism
FINALS	12/20				EXAM 4 (12:00pm - 3:00pm)

Exam Schedule (2024)

Exams will be given during regularly scheduled class time, except for the 4th exam which will be given during our scheduled final exam period. All exams will be given in our regular classroom. You will have 80 minutes to complete exams 1-3, and 3 hours to complete the final exam.

Date	Subject
9/27	Chapters 1-6
10/18	Chapters 7, 8, 10-12
11/15	Chapters 13-18
12/20, 12:00pm - 3:00pm	Chapters 19-22

Academic Integrity Policy

Students are expected to be familiar with Rutgers' [Code of Academic Integrity](#) and the possible penalties (including suspension and expulsion) for violating the policy. Academic dishonesty includes (but is not limited to):

- Cheating
- Plagiarism
- Aiding others in committing a violation or allowing others to use your work
- Failure to cite sources correctly, including artificial intelligence-based tools
- Fabrication
- Using another person's ideas or words without attribution, including re-using a previous assignment
- Unauthorized collaboration
- Sabotaging another student's work

We have a zero-tolerance policy for cheating, and all violations will result in substantial penalties. If you have any doubts or questions about what constitutes academic misconduct, please do not hesitate to contact Dr. Monahan.

Disability Accommodations

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation (<https://ods.rutgers.edu/students/documentation-guidelines>). If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/getting-registered>

For more information, please contact the office of disability services:

Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ
<https://ods.rutgers.edu/>
(848) 445-6800

Student Support and Mental Wellness Services

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901

<https://health.rutgers.edu/medical-and-counseling-services/counseling-services>

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professionals within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community, and consultation and collaboration with campus partners.

Crisis Intervention: <https://health.rutgers.edu/medical-and-counseling-services/counseling-services/crisis-intervention>

Report a Concern: <http://health.rutgers.edu/do-something-to-help/>

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901

<https://vpva.rutgers.edu/>

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

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Additional Services

- Student Success Essentials: <https://success.rutgers.edu>
- Student Support Services: <https://www.rutgers.edu/academics/student-support>
- The Learning Centers: <https://rlc.rutgers.edu/>
- Rutgers Libraries: <https://www.libraries.rutgers.edu/>
- Bias Incident Reporting: <https://studentaffairs.rutgers.edu/bias-incident-reporting>
- Dean of Students – Student Support Office: <https://success.rutgers.edu/resource/dean-students-student-support-office>
- Office of Veteran and Military Programs and Services: <https://veterans.rutgers.edu>

- Student Health Services: <http://health.rutgers.edu/>
- Counseling, Alcohol and Other Drug Assistance Program & Psychiatric Services (CAPS): <http://health.rutgers.edu/medical-counseling-services/counseling/>
- UWill: free immediate access to teletherapy; you can choose a therapist based on your preferences including issue, gender, language, ethnicity. <http://health.rutgers.edu/uwill/>
- Office for Violence Prevention and Victim Assistance: www.vpva.rutgers.edu/
- Office of Disability Services: <https://ods.rutgers.edu/>
- Basic Needs Assistance (food, housing, and other essentials): <https://ruoffcampus.rutgers.edu/basic-needs>
- Rutgers Student Food Pantry: <https://ruoffcampus.rutgers.edu/food-pantry>