COURSE OVERVIEW
General Biochemistry
11:115:403      Spring 2022
Meeting times T, F 12:10pm – 1:30pm
Meeting Location Lecture: Til 204, Livingston Campus
When remote: Zoom room, see canvas
https://rutgers.zoom.us/j/9959119886?pwd=R3ZuTElQT0NvbIJJzNktQbTFtdVhqUT09

CONTACT INFORMATION:
Course Instructor: Dr. Kessler McCoy-Simandle
Office Location: Lipman 118
Email: k.mccoysimandle@rutgers.edu
Office Hours: M 3:00pm – 4:00pm or Thursday 2:00pm – 3:00pm (virtual, see canvas) and By Appointment

COURSE WEBSITE, RESOURCES AND MATERIALS:
Lecture Text:
Lehninger Principles of Biochemistry, 8th Edition
David L. Nelson - Michael M. Cox

Online Learning Platform:
Achieve (https://achieve.macmillanlearning.com/start)
• This is a mandatory online learning platform.
• Must have access to Achieve.
• I would get a two-term access so you have it for the second semester course 404 as well.
• Achieve gives you access to an ebook, but if you want a print copy, a loose-leaf version is available at the bookstore that has Achieve.
• You could also purchase Achieve access and purchase a used or old edition of the book.
• Sign in through canvas and you don’t need an access code for the class.

Website: Rutgers Canvas Page: https://canvas.rutgers.edu
• Achieve will be used for online homework and other support.
• All lecture material, grades, and extra material will be posted on the Canvas page.

COURSE DESCRIPTION:
This course is the first semester of a two-semester integrated survey of biochemistry. Biochemistry describes in molecular terms the structures, mechanisms, and chemical processes shared by all organisms and provides organizing principles that underlie life in all its diverse forms. Students will gain a fundamental understanding of what makes living systems tick at the molecular level. This includes a comprehensive survey of the chemistry of biological compounds, including proteins, polysaccharides, lipids, and nucleic acids, enzyme kinetics, bioenergetics, organelles, and cellular organization.
COURSE SYLLABUS

LEARNING GOALS:

Upon successful completion of this two-semester sequence, students will using the language and reasoning of biochemistry be able to: (greyed sections are the focus of the second semester)

1. Relate the structure and function(s) of the following major classes of cellular components:
   a. Water
   b. Amino acids and proteins
   c. Sugars and polysaccharides
   d. Nucleotides and nucleic acids
   e. Fatty acids and lipids
   f. Membranes and membrane signaling proteins

2. Conceptually map biochemical core concepts:
   a. Levels of proteins structure, motifs, conformational changes, allosteric movements, folding/unfolding
   b. Receptor-ligand affinity
   c. Enzyme mechanisms and inhibition at the active site; substrate and transition state analogs, inhibitors
   d. Membrane chemistry and architecture; active and passive transport

3. Critically assess or Design an experiment using:
   a. Protein purification and analytical separation methods, including column chromatography, isoelectric focusing, and ultracentrifugation
   b. Protein sequencing and analysis, including MALDI and ESI mass spectrometry, Sanger’s reagents, proteases, bioinformatics resources
   c. X-ray diffraction as an approach to atomic level structure/function; use of transition state analogs to pinpoint or modulate the active site
   d. FRET as used in high-throughput enzyme assays; FRET sensors
   e. Michaelis-Menten kinetics as an approach to understanding enzyme mechanisms, including the steady state approximation, kcat, Km, kcat/Km parameters;

4. Assess thermodynamic and entropic cost in biological processes

5. Diagram roles and deviations in enzyme-catalyzed reactions and reaction sequences in organism’s physiology to:
   a. Obtaining chemical energy
   b. Converting nutrient molecules
   c. Polymerizing monomeric precursors in macromolecules
   d. Synthesizing and degrading biomolecules required for specialized functions.

6. Integrate structural components of DNA, RNA, and protein structure to the processes of DNA replication, transcription and translation.
ASSIGNMENTS/RESPONSIBILITIES, GRADING & ASSESSMENT:

Course Grading:

Grades will be based on lecture material (75%) and a cumulative final (25%).

Lecture:

1. Homework assignments through Achieve will be assigned periodically throughout the semester. There will be a penalty for handing in the assignment late (10% of full grade).
2. A total of 3 lecture tests will be given. Exams will assess students understanding by matching, multiple choice, short answer, and discussion questions. This course uses LockDown Browser for the exams. Please see below.

Final Exam: A comprehensive final exam (standardized multiple choice exam) must be taken at the end of the semester.

- Final exams are scheduled by college.

Overall Grade:

<table>
<thead>
<tr>
<th>Homework</th>
<th>Exam 1</th>
<th>Exam 2</th>
<th>Exam 3</th>
<th>Final Exam Grade</th>
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<tbody>
<tr>
<td>25%</td>
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Lowest dropped for 75% total 25%

There are no make ups for any reasons for the three course exams. If you miss an exam, it will be your dropped grade. No exceptions for any circumstances. The final is mandatory and the grade will not be dropped. If you miss the final, you will receive a grade of 0.

Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90 - 100%</td>
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<tr>
<td>B+</td>
<td>88 – 89%</td>
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<tr>
<td>B</td>
<td>80 – 87%</td>
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<tr>
<td>C+</td>
<td>78 – 79%</td>
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<tr>
<td>C</td>
<td>70 – 77%</td>
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<tr>
<td>D</td>
<td>60 – 69%</td>
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<tr>
<td>F</td>
<td>0 – 59%</td>
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Using LockDown Browser and a Webcam for Online Exams

This course requires the use of LockDown Browser and a webcam for online exams. The webcam can be built into your computer or can be the type that plugs in with a USB cable. Watch this short video to get a basic understanding of LockDown Browser and the webcam feature. A student Quick Start Guide is also available.

The directions from Rutgers Canvas page are here:

https://canvas.rutgers.edu/documentation/external-apps/rldb-monitor-students/

To ensure LockDown Browser and the webcam are set up properly, do the following:

- Start LockDown Browser, log into Canvas and select this course.
- Locate and select the Help Center button on the LockDown Browser toolbar.
• Run the **Webcam Check** and, if necessary, resolve any issues.
• Run the **System & Network Check**. If a problem is indicated, see if a solution is provided in the Knowledge Base. Troubleshooting information can also be emailed to our institution's help desk.
• Exit the Help Center and locate the practice quiz named: Testing Equipment REQUIRED: LockDown Browser - Requires Respondus LockDown Browser + Webcam
• Upon completing and submitting the practice quiz, exit LockDown Browser.

Note: You won't be able to access an exam that requires LockDown Browser with a standard web browser. If this is tried, an error message will indicate that the test requires the use of LockDown Browser. Simply start LockDown Browser and navigate back to the exam to continue.

When taking an online exam that requires LockDown Browser and a webcam, remember the following guidelines:

• Ensure you're in a location where you won't be interrupted
• Turn off all other devices (e.g. tablets, phones, second computers) and place them outside of your reach
• Clear your desk of all external materials not permitted — books, papers, other devices
• Before starting the text, know how much time is available for it, and that you’ve allotted sufficient time to complete it
• Remain at your computer for the duration of the test
• If the computer or networking environment is different than what was used previously with the **Webcam Check** and **System & Network Check** in LockDown Browser, run the checks again prior to starting the test
• To produce a good webcam video, do the following:
  o Avoid wearing baseball caps or hats with brims
  o Ensure your computer or tablet is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed or other surface where the device (or you) are likely to move
  o If using a built-in webcam, avoid tilting the screen after the webcam setup is complete
  o Take the exam in a well-lit room and avoid backlighting, such as sitting with your back to a window
• Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted

**ACCOMODATIONS FOR STUDENTS WITH DISABILITIES**
Please follow the procedures outlined at [https://ods.rutgers.edu/students/registration-form](https://ods.rutgers.edu/students/registration-form). Full policies and procedures are at [https://ods.rutgers.edu/](https://ods.rutgers.edu/)

**ABSENCE POLICY:** Attendance in class is expected/required. A single missed class may prove to be a major impediment in understanding the course material. Students who miss a session, are RESPONSIBLE to obtain any material presented during that session, which may include materials not present in the textbook/manual.

Students are expected to arrive a few minutes before the class is scheduled to start.
# COURSE SYLLABUS

## LECTURE SCHEDULE:

<table>
<thead>
<tr>
<th>Week</th>
<th>Chapter</th>
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<tr>
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**Exam 1:** Chapter 1-5

| 6    | 6       | Enzymes |
| 7    | 7       | Carbohydrates and Glycobiology |
| 8    | 8       | Nucleotides and Nuclei Acids |
| 9    | 9       | DNA-Based Information Technologies |

**Exam 2:** Chapter 6-9

| 10   | 10      | Lipids |
| 11   | 11      | Biological Membranes and Transport |
| 12   | 12      | Biochemical Signaling |
| 13   | 12      | Biochemical Signaling |

**Exam 3:** Chapter 10-12

| 14   | 13      | Introduction to Metabolism |
| 15   | 14      | Glycolysis, Gluconeogenesis, and the Pentose Phosphate Pathway |
|      | 15      | The Metabolism of Glycogen in Animals |

16 Final

Note: The syllabus is subject to change without notice.

**FINAL EXAM/PAPER DATE AND TIME**
Online Final exam Schedule: [http://finalexams.rutgers.edu/](http://finalexams.rutgers.edu/)
ACADEMIC INTEGRITY

The university's policy on Academic Integrity is available at http://academicintegrity.rutgers.edu/academic-integrity-policy. The principles of academic integrity require that a student:

- properly acknowledge and cite all use of the ideas, results, or words of others.
- properly acknowledge all contributors to a given piece of work.
- make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
- obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- all student work is fairly evaluated and no student has an inappropriate advantage over others.
- the academic and ethical development of all students is fostered.
- the reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

*If you are caught cheating during any exam period, no matter the reason, you will receive a zero for that assignment and potentially the class. LockDown Browser is required for all exams and quizzes.*

*The Instructor reserves the right to fail a student for the course or fail a student for an assignment in which the student is academically dishonest.*

Just In Case Web App  http://codu.co/cee05e
Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)
(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ www.rhscaps.rutgers.edu/
CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional 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.

Violence Prevention & Victim Assistance (VPVA)
(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.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.
Disability Services
(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / https://ods.rutgers.edu
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/registration-form.

Scarlet Listeners
(732) 247-5555 / https://rutgers.campuslabs.com/engage/organization/scarletlisteners
Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.