

Chemistry 160:581 – Biochemistry - Syllabus for Fall 2020

Lectures Tuesday and Friday 6:00-7:20PM

There will be interactive lectures twice a week; while I will attempt to tape these lectures, I prefer that you are present at the lecture times.

The videocasts are protected by copyright laws. The copyright ownership of the videocasts and podcasts vests in either the Professor teaching the course, or to Rutgers University to the extent applicable. The copyright owner of the videocasts grants you a non-exclusive and limited license only to replay them for your own personal use during the course. Sharing them with others (including other students), reproducing, distributing, or posting any copyright protected part of the videocasts or podcasts elsewhere-including but not limited to any internet site-will be treated as a copyright violation and an offense against the honesty provisions of the Code of Student Conduct.

Place: On Blackboard, entire course online, make sure that you have access.

Instructor: Professor Frank Jordan, with possible participation of guest lecturer on Chapter 9.

(Office: Olson Laboratories, Room 240; not during coronavirus pandemic)

Email: frjordan@rutgers.edu

Getting in touch: is best done by email.

Office Hours: Tuesday and Friday 3-5PM.

Tentative Exams: Two 2-hour exams (a midterm and a final) and 3-4 shorter quizzes; to be discussed at the beginning of lectures. There are no make-up exams, each exam will weigh 40%, the quizzes add up to 20%. Exams will be mostly multiple choice with open book/notes.

Final Grade Determination:

Letter grades will be assigned to your standing in class, where the median grade will be a B (this being a graduate course, grades range as F, C, C+, B, B+, A). Students with more than 25 points below the median will receive an F grade.

ADD/DROP PERIOD - 9/1/20 - 9/14/20

LAST DAY TO DROP - 9/14/20

LAST DAY TO ADD - 9/11/20

Withdrawal to receive "W" Grade: 11/23/20

Text Book (required):

Title: Fundamentals of Biochemistry (Fifth Edition)

Authors: Donald Voet, Judith G. Voet, Charlotte W. Pratt.

Publisher: Wiley. ISBN: 978-1118-91840-1

Students are requested to purchase the WileyPlus version, which has ample exercises throughout.

The course is also appropriate for a 1-semester senior undergraduate ‘introduction to biochemistry’, with a year of organic chemistry and preferably some physical chemistry being pre-requisites.

Goals of the course:

Biochemistry is an enormous and complicated topic, all of its parts cannot be taught or digested in a one-semester graduate level lecture course. The topic of biochemistry touches every aspect of human health and disease, and the course should be useful to individuals furthering their graduate training and working for advanced degrees, and those in industrial jobs wishing to undertake continuing education.

A strong prior preparation in organic chemistry and some preparation in physical chemistry are useful pre-requisites.

This one-semester course introduces the structural aspects of the four major classes of biopolymers: nucleic acids, carbohydrates, proteins and lipids, with a significant emphasis on proteins and enzymes. It also introduces methods of separation of proteins and nucleic acids, and some biological spectroscopy. Finally, the course introduces the important topic of metabolic pathways, concentrating on sugar metabolism and its utility in the citric acid cycle.

The course is a very useful foundational one for any of the following course topics as well, some of which are offered in the Chemistry Department, while others in the Department of Biological Sciences.

In the Chemistry Department (at irregular intervals):

1. Enzyme Kinetics and Mechanisms
2. The Enzymatic Reactions of Metabolic Pathways
3. Physical Biochemistry
4. Biochemistry Laboratory

In the Department of Biological Sciences:

1. Cell Biology
2. Molecular Biology

Course Topics The number of sections covered each week is approximate.

Lecture

1. **Tue. Sept. 1. 2020** Part I: Introduction, Water Chemistry,
2. **Fri. Sept. 4.** Part II, Nucleotides, DNA and Genetic Information
3. **Fri. Sept. 11** Part II, 4,5 Amino Acids, Primary Protein Structure
4. **Tue. Sept. 15**
5. **Fri. Sept. 18** Chapter 6, 7: Proteins: Three-Dimensional Structure, Function Globins and Myosin
6. **Tue. Sept. 22**
7. **Fri. Sept. 25**
8. **Tue. Sept. 29** Chapter 8: Carbohydrates
9. **Fri. Oct. 2**
10. **Tue. Oct. 6.** Chapter 9, 10: Lipids and Membranes
11. **Fri. Oct. 9**
12. **Tue. Oct. 13** **Exam 1, Chapters 1-9, 5-10PM, any 2 hour period (exam clocked)**
13. **Fri. Oct. 16** Chapter 11: Enzyme Catalysis
14. **Tue. Oct. 20**
15. **Fri. Oct. 23** Chapter 12: Enzyme Kinetics and Inhibition
16. **Tue. Oct. 27**
17. **Fri. Oct. 30** Chapter 13: Biochemical Signaling, Allostery
18. **Tue. Nov. 3**
19. **Fri. Nov. 6.** Chapter 14: Introduction to Metabolism
20. **Tue. Nov. 10**
21. **Fri. Nov. 13** Chapter 15: Glucose catabolism
22. **Tue. Nov. 17**
23. **Fri. Nov. 20** Chapter 16: Glycolysis and Gluconeogenesis
24. **Tue. Nov. 23**
25. **Wed. Nov. 25** Chapter 17: Citric acid cycle
26. **Tue. Dec. 1**
27. **Fri. Dec. 4** Chapter 18: Oxidative Phosphorylation
28. **Tue. Dec. 8**

**Final exam. Tuesday Dec. 15, 5-10PM, any 2 hour period (exam clocked)
Chapters 11-18**

Odd-numbered problems related to each topic at the end of each chapter of the text will be assigned; answers are found at the end of the text.

All course-related material will be posted on Blackboard.

Academic Integrity

As an academic community dedicated to the creation, dissemination, and application of knowledge, Rutgers University is committed to fostering an intellectual and ethical environment based on the principles of academic integrity. Academic integrity is essential to the success of the University's educational and research missions, and violations of academic integrity constitute serious offenses against the entire academic community. The entire Academic Integrity Policy can be found here: <http://academicintegrity.rutgers.edu/academic-integrity-policy/>

Accommodation and Support

Rutgers University Newark (RU-N) is committed to the creation of an inclusive and safe learning environment for all students. RU-N has identified the following resources to further the mission of access and support:

- **Students with Disabilities:** Rutgers University welcomes students with disabilities into all of the University's educational programs. The Office of Disability Services (ODS) is responsible for the determination of appropriate accommodations for students who encounter barriers due to disability. In order to receive consideration for reasonable accommodations, a student with a disability must contact ODS, register, have an initial appointment, and provide documentation. Once a student has completed the ODS process (registration, initial appointment, and documentation submitted) and reasonable accommodations are determined to be necessary and appropriate, a Letter of Accommodation (LOA) will be provided to the student. The student must give the LOA to each course instructor, followed by a discussion with the instructor. This should be completed as early in the semester as possible as accommodations are not retroactive. More information can be found at ods.rutgers.edu. Contact ODS: (973) 353-5375 or ods@newark.rutgers.edu.
- **Religious Holiday Policy and Accommodations:** Students are advised to provide timely notification to instructors about necessary absences for religious observances and are responsible for making up the work or exams according to an agreed-upon schedule. The Division of Student Affairs is available to verify absences for religious observance, as needed: (973) 353-5063 or DeanofStudents@newark.rutgers.edu.
- **Counseling Services:** Counseling Center Room 101, Blumenthal Hall, (973) 353-5805 or <http://counseling.newark.rutgers.edu/>.
- **Students with Temporary Conditions/Injuries:** Students experiencing a temporary condition or injury that is adversely affecting their ability to fully participate in their courses should submit a request for assistance at: <https://temporaryconditions.rutgers.edu>.
- **Students Who are Pregnant:** The Office of Title IX and ADA Compliance is available to assist students with any concerns or potential accommodations related to pregnancy: (973) 353-1906 or TitleIX@newark.rutgers.edu.
- **Gender or Sex-Based Discrimination or Harassment:** Students experiencing any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking, should know that help and support are available. To report an incident, contact the Office of Title IX and ADA Compliance: (973) 353-1906 or

TitleIX@newark.rutgers.edu . To submit an incident report: tinyurl.com/RUNReportingForm. To speak with a staff member who is confidential and does NOT have a reporting responsibility, contact the Office for Violence Prevention and Victim Assistance: (973) 353-1918 or run.vpva@rutgers.edu .

Learning Resources:

· **Rutgers Learning Center** (tutoring services)

Room 140, Bradley Hall

(973) 353-5608

<https://sas.n.rutgers.edu/student-support/tutoring-academic-support/learning-center>

· **Writing Center** (tutoring and writing workshops)

Room 126, Conklin Hall

(973) 353-5847

nwc@rutgers.edu