



BIO280 Biochemistry Spring 2020

INSTRUCTOR: Dr. Nathan S. Astrof PhD, Department of Chemistry and Biochemistry

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Office: HN1321A (13th floor of the North Building)

Office Hours: Online (Zoom) Thursday 7:00 PM to 8:00 PM

CLASS MEETINGS:

This is a fully online course.

SUGGESTED TEXTBOOK: Principles of Biochemistry, Author: Moran, Horton, Srimgeour, and Perry Publisher: Pearson, 5th Edition (2012). No textbook purchase is required; feel free to consult any text published within the past three years.

COURSE MATERIALS: The course will use Blackboard as a central learning platform. All Powerpoint slides, lecture notes, videos, homework and exams will be posted on Blackboard. The Sapling system will be used for weekly homework submissions.

LATENESS POLICY: All quizzes, exams and other assignments must be completed by the assigned deadline. No late work will be accepted.

Exam #	Date
1	Week 5
2	Week 10
3	Finals Week

SCOPE OF THE COURSE: This course provides a comprehensive overview of Biochemistry, including the structure and metabolism of the major classes of biomolecules (proteins, carbohydrates, nucleic acids, lipids, and small molecule metabolites). Topics to be covered include properties of water; principles of bioenergetics; structure, chemical properties, and function of proteins, nucleic acids, carbohydrates, and lipids; principles of recombinant DNA technology; membrane properties and transport; enzyme kinetics, mechanism, and regulation; and fundamentals of metabolism.

COURSE LEARNING OUTCOMES: Upon completion of this course, students should:

Develop comprehensive knowledge of physical and chemical features that govern reactivity and behavior of metabolites and macromolecules within living systems, including the role of acid-base properties, electrical charge, thermodynamics, and kinetics of biological systems, and their application to understand certain cellular phenomena;

Be proficient in relating the structure and chemical/physical properties of biological macromolecules with their biological function;

Acquire skills to quantify biochemical parameters such as the relationship between pH, pK_a , and charge of a biomolecule; kinetic properties, reaction rates, and chemical mechanism; and thermodynamic parameters and chemical activity.

PREREQUISITE COURSES AND BACKGROUND: Students should have completed previous coursework in biology, general chemistry, and organic chemistry – and be able to **apply** the information from those disciplines. More specifically, students should have knowledge of fundamental biological principles (*e.g.* cellular structure, function, and activity) and the structures and chemical reactivity of organic functional groups, and should be facile with mathematical calculations involving exponents, logarithms, and basic algebraic equations. It is your responsibility to be familiar with the background material, and to review background skills and information as necessary.

CLASS PARTICIPATION: Your presence during the weekly Zoom office hours is important. We will hold a 40-minute meeting (extendable to 1 hour if needed) each week. While these meetings are not required, they represent the best opportunity for you to resolve uncertainties in the course material and for me to assess your understanding of the material outside of a graded exam.

COURSE RESOURCES: You will be provided with PowerPoint-based note sets on Blackboard. You are responsible for all materials in the notes and associated video content.

GRADING: Final course grades will be assigned based upon performance on participation, quizzes and exams. **Any material covered in class, recitation, in the PowerPoint notes, or that you have been assigned to read may be included on a quiz or exam.** Exams are scheduled in advance (see first page and calendar). Quizzes are weekly and exams will be distributed the week posted. There are no make up quizzes or exams. There are no extra credit assignments.

Grading Component	Points
Homework (14)	1400
Exams (3)	600
Total	2000

A total of 500 points will be distributed as above. Grades will be assigned in accordance with the Hunter College policy on grading (which takes precedence over anything in this syllabus), and no curve will be applied to an exam or to the final grade. There is no extra credit. The following letter grades will be assigned based upon total points accrued for all course work:

Letter Grade	%
A ⁺	97.5-100
A	92.5-97.4
A ⁻	90.0-92.4
B ⁺	87.5-89.9
B	82.5-87.4
B ⁻	80.0-82.4
C ⁺	77.5-79.0
C	70.0-77.4
D	60.0-69.0
F	00.0-59.9

CREDIT/NO CREDIT: Students the opt to take the course for credit/no credit must present in person a signed copy of the appropriate form at least one day prior to the last examination. No forms will be signed or accepted the day of the last examination or after the examination. The decision to request credit/no credit is irrevocable once the form has been submitted. To obtain credit, students must obtain the grade equivalent of a C in the course. Note that the number of times the credit/no credit option may be used is limited. It is the student's responsibility to determine their eligibility for the credit/no credit option.

STRATEGY FOR SUCCESS: The study of biochemistry builds on principles of general and organic chemistry, biology, and fundamental math skills, in order to analyze the chemistry and physics of living systems – and thus you will need to integrate knowledge from several disciplines in order to develop a thorough comprehension of biochemistry. A great deal of information will be covered this semester, and it is essential that you keep up if you want to do well in the course.

In summary: *this course covers a great deal of material involving application of chemical and physical principles to biological systems. It requires that you integrate skills, information, and concepts from previous coursework. In order to do well, it is important to adopt a consistent strategy of study and practice.*

HONOR CODE: The Academic Honor System of CUNY is based on the premise that each student has the responsibility to: (1) uphold the highest standards of academic integrity in his/her own work; (2) refuse to tolerate violations of academic integrity in the University community; and (3) foster a high sense of integrity and social responsibility on the part of the University community. *This means that you will not give or receive information during an exam, not consult unauthorized sources of information during an examination, and not tolerate violations of this code by others. All written work on exams must be in your own words; repeating text from the notes, textbook and other*

sources is considered cheating even if such material is not directly accessed during the examination. During an exam or quiz, having a cell phone, tablet or other electronic device in your possession (other than an approved calculator) is considered cheating irrespective of whether the device is being accessed. Students should review the Academic Honor System outlined in the Hunter College Student Handbook. Violations of the Honor Code will not be tolerated and will result in zero points being awarded for the course work in question and in the violation being reported to the appropriate office, where it will remain on permanent record.

ACADEMIC CALENDER: Although the class meets fully online, we follow the Hunter Academic Calendar for holidays and other events. Please consult the academic calendar for your reference.

STUDENTS WITH DISABILITIES: Students with disabilities needing academic accommodations should: 1) register with and provide documentation to the Student Disability Resource Center (SDRC); and 2) bring the approval letter/ accessibility card to me and the recitation instructor from the SDRC indicating that you need academic accommodations. *Please do this within the first two weeks of the class.*

Weekly Schedule

Lesson Number	Topic
1	Chemical and Biological Foundations of Biochemistry
2	Water and Weak Interactions
3	Amino Acids, Peptides and Proteins
4	Protein Function
5	Biothermodynamics
6	Enzymes: Mechanisms and Kinetics
7	Carbohydrates
8	Nucleic Acids Metabolism and Protein Synthesis
9	Lipids, Membranes, Bio-signaling
10	Glycolysis, Gluconeogenesis, Pentose Phosphate
11	Glycogen Metabolism
12	Citric Acid Cycle, Oxidative Phosphorylation and Mitochondria
13	Lipid Metabolism (Synthesis, Catabolism and Regulation)
14	Nitrogen Metabolism and the Urea Cycle