CHEM 376/640 Biochemistry I
Fall 2025

Instructor: Dr. Nathan S. Astrof PhD **email**: nathan.astrof@hunter.cuny.edu
Office: Thomas Hunter Building TH506.
Office Hours: TBA (Please see Brightspace).

Lecture: Monday/Wednesday 4:00 – 5:15 Hunter West Building 615 (HW615)

Lecture attendance is strongly suggested but not required; however, any additional credit points assigned at lecture is only available to students that have attended the lecture(s) in which it was assigned.

Recitations:

Section Number	Day	Time	Location
1R01	Monday	12:30 – 1:20	North C109
1R02	Tuesday	5:30 – 6:20	North 1527
1R03	Monday	10:30 – 11:20	North C109
1R04	Monday	11:30 – 12:20	North C109
1R05	Wednesday	2:30 – 3:20	West W217

You may only attend the recitation for which you have registered. You may not switch recitations without changing your registration. There are no make-up recitations. Note that new material may on occasion be introduced at recitation and you are responsible for this material.

Textbook: There is no required or recommended textbook for this course. Notes will be distributed along with the PowerPoint slides. You are responsible for all content in the notes and slides as well as any supplemental postings or readings on Blackboard.

Examination Dates:

Exam 1	10/6
Exam 2	11/3
Exam 3	11/24
Exam 4	TBA

Scope of the Course: Welcome to Biochemistry I (CHEM 376/640). This is the first course of a two-semester program recommended for chemistry, biochemistry, and pre-health-professional students, or for graduate students requiring a broad introduction to biochemistry. The major

objective is to develop the tools to analyze biological function in chemical terms – the physical, chemical, and biological principles by which a biomolecule, reaction, or pathway operates – and to provide a comprehensive overview of the chemical concepts that govern biological processes. Topics to be covered include properties of water; principles of bioenergetics; structure, chemical properties, and function of proteins, nucleic acids, carbohydrates, and lipids; membrane properties and transport; enzyme kinetics, mechanism, and regulation.

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 two semesters each of 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. Any material covered in an earlier pre-requisite course may be utilized to explain core course concepts.

Expectations of Students and Instructors: Students should come to class prepared to learn, stay current with the material, and review background material as necessary. You should keep up with lectures, reading, recommended ,or assigned problems, and skills. CHEM 376/640 has a required recitation session each week to review lecture material, practice skills and participate in group-learning activities. Recitation questions are assigned in advance; to make the best use of recitation sessions and to earn class credit, it is highly recommended that you work the problems before the recitation. **You are required to attend the recitation to which you are registered**. Participation points can only be earned in the recitation for which you have attended, and no student may attend a recitation other than the one they have registered for. To obtain any credit for a recitation, you be in your seat at the start of the recitation, be prepared to participate in the recitation, and remain through the entire recitation session.

Instructors and PeerTAs facilitate student learning during lectures and recitations, respectively, and assist you in applying information and skills to solve problems. However, you are responsible for developing and applying the necessary skills and integrating individual lectures into a comprehensive picture. Peer Group Leaders, and your instructor may be available on a regular

basis for office hours to assist you with course material. Please make use of this resource, and come to us with specific. You should not wait until examination time – worse yet, until the end of the semester – to resolve topics that are unclear to you or to learn skills to solve problems. Students learn best when there is a climate of respect among students and between students and instructors. Every effort should be made by all involved, at all times, to foster a productive, positive, communicative, and respectful environment.

Class Attendance: Your presence in both lecture and recitation is important, as some material will be covered that is not included in the notes, different topics may be emphasized, and quantitative skills will be practiced. Please arrive to class/recitation on time, stay until the end, and make sure your cell phone (including texting functions) is silenced and put away. **Some supplemental work (extra credit) may be assigned at lecture and only students attending the lecture are eligible to obtain these points**.

Recitations: Recitations provide an excellent opportunity to work on problems in a group setting, to ask questions and resolve uncertainties in the course material**.** Participation at recitation is mandatory. To obtain any credit for attending a recitation, you must arrive on time, come prepared with suitable work (as defined by the instructor), actively participate in the recitation discussion (by asking or answering questions), and remain until the end of the recitation. You must attend the recitation section that you enrolled in. There are no make-up recitations and there are no excused absences for recitation. However, you may miss up to four recitations during the semester without penalty. You are not required to provide an excuse for any missed recitations. However, after four recitations are missed, there are no additional missed participation opportunities allowed without loss of credit for any reason.

Course Resources: You will be provided with PowerPoint-based note sets on Blackboard before each topic is covered in class. These materials are designed to facilitate note taking by emphasizing important discussion points, structures, or figures – but they are only "templates" to assist with taking notes in class and by no means replace the need to attend lectures, nor do they cover all material discussed in class. In addition, recitation questions and practice problem sets will be posted on the Blackboard website. In addition to office hours, some of the Peer Group Leaders may offer weekly focus groups to review/practice skills and problems and in some cases group review sessions before exams. **Under no circumstances are TAs or Peer Group Leaders ever permitted to charge a fee for you to attend any office hours, reviews, focus groups, etc.**

Grading: Final course grades will be assigned only based upon performance on recitations and exams. **Any material covered in class, recitation, in the PowerPoint notes, or that you have been assigned to read (whether covered in class or not) may be included on an exam.** Exams are scheduled in advance (see first page and calendar).

Your grade will be computed exclusively and without exception using the following table:

Item	Points
Recitation	50
Exam 1	90
Exam 2	90
Exam 3	90
Exam 4	90
'Exam 5'	90
Total	500

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) with no rounding, 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^+	77.5-79.9
C	70.0-77.4
D	60.0-69.9
F	00.0-59.9

If, due to religious observance, illness, military service or requirements of the court, a documented absence is deemed excusable, one midterm exam can be missed. In these cases, students are required, if it is possible, to notify Dr. Astrof of the need to miss the exam in advance. Notification must take place in the most timely fashion possible as determined by the course instructor. Medical notes must include the specific diagnosis and reason why the student may not take the exam. Extra credit points are attached to a specific exam and will not carry forward due to an excused exam absence. There are no make-up exams for any midterm or the final. Furthermore, you must take the final to pass the course. If you are excused from one of the three lecture examinations (but not the final), your course points will be distributed as:

Item	Points
Recitation	50
Exam 1	150
Exam 2	150
Final Exam	150
Total	500

and the letter grade will be determined using the Hunter College grading scale as above.

CHM640: Graduate students taking Biochemistry I for credit must enroll in CHM640. Students enrolled in CHM640 must complete an additional project that will be factored into their grade. Students enrolled in CHM640 should consult the course instructor at the start of the semester to discuss the additional required project.

Official Communications: All requests for grading evaluations (regrading of questions or recalculation of exam scores) must be made by email. No in-person grade recalculation or exam regrading requests that are made in-person are considered binding. All such requests for Exams 1- 3 must be made within two weeks of the examination being returned. Requests after this time will not be considered.

Exam Collection: All students are responsible for collecting their own in class examinations for Exams 1 – 3. Exams will only be distributed to the student who took the examination. Exams 1 – 3 will be discarded two weeks after the first date of return. Exam 4 will not be returned but students may schedule an appointment to review the examination.

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, rather than cramming before exams.*

Academic Integrity Policy

Academic integrity (honesty) is the cornerstone of science and education Failure to maintain the highest standards of academic integrity jeopardizes the pursuit of knowledge and the ability to establish fair grades based on exclusively on knowledge and effort. The following is an elaboration of the course academic integrity policy.

(1) Cheating is defined as taking credit for work that is not one's own as well as accessing or attempting to access any information that has not been authorized for your use during an examination.

(2) Cheating includes, but is not limited to, viewing, or attempting to view the work of another student during an examination.

(3) Cheating also includes, but is not limited to, having possession of notes or other unauthorized information stored on an electronic device while taking an examination. You do not need to be attempting to access these notes or other unauthorized information for cheating to occur; the possession of such materials is sufficient to count as cheating.

(4) Cheating also includes, but is not limited to, the possession of any unauthorized device (such as but not limited to a cell phone, computer, smart-watch, tablet or graphing calculator) during an exam. You do not need to be accessing or attempting to access the device for it to count as cheating. The device in your possession does not need to contain any unauthorized information for its possession to be counted as cheating. **During an examination, you may not be in possession of any device that can store or display unauthorized information**.

(5) Cheating also includes, but is not limited to, taking more than one copy of an examination for later personal use or distribution.

(6) You do not need to successfully commit misconduct for it to count as cheating.

(7) There is not distinction between minor cheating on a single question or cheating on the entire exam; both circumstances will be treated identically.

(8) **The penalty for cheating is an irrevocable grade of zero for the entire examination; the grade for Exam 5 will also be a zero.** There are no exceptions to this policy and there will be no make-up opportunities for work that has obtained a grade of zero due to violations of the academic misconduct policy.

(9) Applications of this policy by the course instructor do not preclude further action by Hunter College or CUNY.

Code of Conduct:

All students participating in the course are expected to treat all fellow students, the Peer TAs, and the instructor with dignity and respect and taking no action that would discriminate against any individual on the basis of their age, appearance, race, origin, religion, gender, sexual orientation, or differences in physical abilities. Conversations in lecture must be limited to the course material. Failure to conduct oneself in an appropriate manner can result in loss of points from examinations and/or recitations. Any student creating a distraction during any portion of a lecture will be subject to a penalty on the examination score. Any student creating a disturbance during an examination that might interfere with the work of other students will be dismissed from the examination and will obtain a grade of zero both for the exam in question and exam 5. Any

student that creates a hostile environment for other members of the course during recitation will be dismissed from the recitation and receive an irrevocable zero for the entire semester recitation grade. An exam penalty will be applied for any student creating a distraction during the lecture period.

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.

On any examination, any single incident of academic misconduct will result in an irrevocable grade of zero for the entire examination. There are no make-up exams or excused examinations for exams in which academic misconduct has occurred. On every question on the examination, you must do your best to answer the question presented to you. The addition of editorial comments written on the examination will be regarded as academic misconduct and penalized accordingly

Class Recordings: You have permission to make audio recordings of the lecture class section but not the recitation session or office hours. You may not make video recordings of any portion of the course, including lectures, recitations, or office hours.

Academic Calendar: Please consult the academic calendar for class meeting dates. Note that throughout the semester there may be inversion days when classes meet on alternative schedules. You are responsible for knowing the time and dates for class and recitation meetings as well as examinations.

Health and Safety Policy

Due to the ongoing COVID-19 pandemic, and in particular the emergence of variants with higher infectivity, CUNY and Hunter College may implement a series of health and safety policies. If these policies are implemented at any time during the semester, you will be required to follow them. This statement adds these policies to the course syllabus and makes them gradable items.

(1) The failure to comply with the CUNY/Hunter College policy on vaccinations will result in loss of access to the Hunter College campus and can impact your ability to obtain recitation points and sit for examinations. The loss of access to campus due to this policy will **not** constitute an excused absence and there will be no make-up work for class sessions and

examinations missed due to the inability to obtain campus access due to violations of the CUNY vaccination policy.

(2) CUNY may institute a face-mask policy. Failure to comply with this policy at any point during a lecture, recitation, examination, or any other occupancy of a classroom, will result in the deduction of course grading points with the value of the deduction entirely at the discretion of the instructor. To comply with the policy, it is necessary to wear an appropriate face covering that **properly covers both the mouth and nose and is properly fitting.**

Students With Differential Abilities: Students with differential abilities needing academic accommodations should: 1) register with and provide documentation to the Resource Center and 2) bring the approval letter/ accessibility card to me indicating that you need academic accommodations. *Please do this within the first two weeks of the class. Only pre-approved students can obtain academic accommodations.*

Examination Seating: During an examination, you are free to take any available seat consistent with restrictions established by the instructor. If you are asked by the instructor or a proctor to move to a different seat before or during an examination, you must do so. Failure to comply with these instructions will result in a grade of zero for your examination. You are required to record your name seat number on the examination. The failure to do so will result in a loss of points from your examination at the discretion of the instructor.

Tentative Lecture Schedule

Class #	Topic	Date
1	What is Biochemistry?	Aug 27
2	Water and Molecular Interactions	Sept 3
3	Water and Molecular Interactions	Sept 8
4	Biological Thermodynamics	Sept 10
5	Biological Thermodynamics	Sept 15
6	Amino Acids	Sept 17
7	Peptides	Sept 29
8	**Exam 1**	Oct 6
9	Peptide Synthesis and Sequencing	Oct 8
10	Protein Structure	Oct 14*
11	Protein Folding	Oct 15
12	Antibodies and Fibrous Proteins	Oct 22
13	Oxygen Transport Proteins	Oct 24**
14	Enzymes: Fundamentals	Oct 27
15	Enzymes: Mechanisms	Oct 29
16	**Exam 2**	Nov 3
17	Enzymes: Kinetics	Nov 4
18	Enzymes: Regulation	Nov 10
19	Enzymes: Inhibitors	Nov 12
20	Carbohydrates: Monosaccharides	Nov 17
21	Carbohydrates: Polysaccharides	Nov 19
22	**Exam 3**	Nov 24
23	Lipids: Structures	Nov 26
24	Lipids: Cell Membranes	Dec 1
25	Lipids: Transport across Membranes	Dec 3
26	Nucleic Acids	Dec 8
27	Nucleic Acids	Dec 10
28	Protein Purification and Quantification	Dec 15
	FINAL EXAMINATION	**TBA*** **

***Note October 14 is an inversion day. On this day, Tuesday will follow a Monday lecture and recitation schedule*.**

****Note October 24 is an inversion day. On this day, Friday will follow a Monday lecture and recitation schedule*.**

*****The day and time of the final examination are determined by Hunter College. They will be posted on Brightspace when available.***