

CHEM 673: Biochemistry Spring 2025 Course Syllabus

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

COURSE INFORMATION

Course Description: CHEM-673

Number of Credits: 3

Pre-requisites: Students must have an in-depth understanding of general and organic chemistry

Instructor: Patrick DePaolo, PhD

Email: depaolo@njit.edu

Course-Section	Meeting Times
CHEM-673 Section 104	Thursday 6:00 – 8:50 PM KUPF 105

Office Hours: Monday 3:00PM – 5:30PM & Thursday 3:00PM – 4:00PM in Tiernan B006 (Basement)

Zoom Lecture meeting room: <https://njit-edu.zoom.us/j/98154348071>

Meeting ID: 981 5434 8071

Webpage: The course website is available through Canvas, which can be accessed via canvas.njit.edu. Please email your instructor immediately if you cannot access the class site. All materials including lecture summaries, any PowerPoint slides, and other documents will be posted on the class site. Please check the site frequently for new materials and announcements. All grades for this course will be posted to Canvas on a regular basis. You are responsible for all updates posted to Canvas, and if you find any mistakes in content or grading, or you need help accessing these materials, please contact your instructor as soon as possible.

Optional Textbook:

Title	Biochemistry
Author	Berg, Tymoczko, Stryer
Edition	7 th

University-wide Withdrawal Date: The last day to withdraw with a **W** is Monday, April 7th, 2025.

Prerequisites: Students should have taken courses that allow them to:

Explain chemical bonding, molecular structure and function, polarity of molecules, hybridization theories, intermolecular forces of attraction, hydrogen bonding.

Explain concepts relating to the first, second, and third law of thermodynamics (meaning enthalpy, free energy, entropy and equilibrium constants, spontaneous, exothermic, and endothermic reactions)

Learning Outcomes:

1. Describe the basic elements of the structure of proteins, nucleic acids, carbohydrates, lipids and the linkages between them
2. Describe higher-order structure in proteins and relate it to function
3. Illustrate examples to demonstrate that structure determines function
4. Demonstrate the role of the intermolecular forces in macromolecular structure and function
5. Apply knowledge of chemical kinetics in understanding enzyme catalysis and mechanism
6. Interpret kinetic data and identify types of enzyme inhibition
7. Write and describe the key biosynthetic pathways in living systems
8. Apply thermodynamic principles to understand energy production in biological systems
9. Discuss endergonic and exergonic reactions and coupled processes
10. Discuss Electron transport and energy production
11. Discuss biochemical processes: replication, transcription, translation
12. Describe the flow of biological information and discuss how a mutation in DNA can alter cell function
13. Describe the different levels at which macromolecular function can be regulated
14. Learn to read primary literature and evaluate the merits and demerits of a scientific article

POLICIES

All CES students must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforces them strictly. **NO CHEATING!** All homework assignments should be completed individually without the help of other students. You are allowed to use your class notes and information online to assist you with the homework assignments. You are **NOT PERMITTED** to use notes, electronic devices, or any assistance on the mid-term and final exams. If you are caught cheating you will receive a zero on the exam.

Grading Policy: The final grade in this course will be determined by a point total based on the following:

Homework	200
Attendance	100
Midterm Exam	300
Final Exam	300
Final Project	100
Total points	1000

Your final letter grade in this course will be based on the following *tentative* curve:

A	>900	C	550 – 599
B+	800 – 899	F	< 550
B	700 – 799		
C+	600 – 699		

ATTENDANCE POLICY: Attendance at class is **mandatory** and will be recorded with iClicker. Each class is a learning experience that cannot be replicated through simply “getting the notes.” iClicker can be downloaded through the Apple App store or Google Play store and is completely free to use. We will be using attendance features only.

LECTURE (CONVERGED): Each lecture will have in-person and online modality through Zoom. The link to join the Zoom session will be posted on the course canvas page and in the syllabus. In-person attendance is required for the mid-term, final exam, and final project dates.

IClicker IN CLASSROOM: In order to track attendance we will use using iClicker Cloud. Each student must download the *iClicker Student app* (formerly iClicker Reef app) to their mobile device or laptop and sign up for at least the 6 month license (FREE). Students must create an account in the application or, if they have an account already, simply sign in. **When creating your profile, please use your name and NJIT email as it appears on the class roster.** Instructors will be using this app to assign grades so having the correct name and email is vital to getting the points you earned! Once in the app, simply select the “add a class” button (top right, appears as a plus sign), search for New Jersey Institute of Technology, and select the course with the name your instructor provides.

CLASS RECORDINGS: Class sessions may be recorded by the instructor. These recordings shall only be used as an educational resource and are not to be distributed or used outside of this class. Information on how to access recorded lectures will be made available by your instructor. Any recordings that contain identifiable information about students will not be used beyond this semester.

CLASS RECORDING ETIQUETTE: Students are expected to respect their fellow students’ privacy and freedom to learn without disruption. Students are not allowed to capture or reproduce anyone’s name, image, or voice without permission. They must be polite and respectful in the online chat. Informal chat is okay, but typing is restricted to things that one would say out loud in front of the entire class. Students must always conduct themselves on their webcam video as they would in person in a classroom.

COURSE LEARNING RESPONSIBILITY: COVID-19 pandemic has required that both instructors and students make changes to their normal working protocols for courses. We will still have content and quizzes online. As a result, students are asked to practice extra care and attention in regard to academic honesty, with the understanding that all cases of plagiarism, cheating, multiple submission, and unauthorized collaboration are subject to penalty. Students may not collaborate on exams or assignments, directly or through virtual consultation, unless the instructor gives specific permission to do so. Posting an exam, assignment, or answers to them on an online forum (before, during, or after the due date), in addition to consulting posted materials, constitutes a violation of the university’s Honesty policy. Likewise, unauthorized use of live assistance websites, including seeking “expert” help for specific questions during an exam, can be construed as a violation of the honesty policy. All students should be familiar with the NJIT integrity code: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

In addition to adhering to the NJIT Integrity statement, learning in the current environment also places a significant amount of responsibility on you. Please utilize all the resources that are available to you to be successful in the courses. Examples include paying full attention in class, copying notes, accessing the tutoring center, going to instructor office hours for help.

HOMEWORK POLICY:

Homework is 100% online and accessed via CANVAS. The homework is to test your understanding of the material being taught. This homework will build on the classroom content and enhance your understanding of the material. This

homework will also be good preparation for the mid-term and final exams. To maximize your ability to learn through the homework each assignment allows multiple attempts. Each homework assignment has its due date. In addition, Canvas has a calendar with due dates. **ALL HOMEWORK MUST BE DONE ON TIME.** There is no credit for late homework.

EXAMS: There will be a midterm and a final exam held at class time during the semester. The following exam periods are tentative and therefore possibly subject to change:

Midterm	2/27
Final	5/15

The final exam will test your knowledge of the second half of material taught in the course.

ADMINISTRATION OF EXAMS: During the exams, you cannot use electronic devices besides a non-graphing calculator. There are no notes or books of any kind permitted, and you cannot speak with anyone during the exams. Failure to follow these guidelines will result in a grade of zero for the exam and an automatic F for the class. These rules are taken very seriously. There is a no tolerance policy for cheating of any kind.

MAKEUP EXAM POLICY: There will normally be NO MAKE-UP EXAMS during the semester. In the event that a student has a legitimate reason for missing a quiz or exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the CES Department Office/Instructor that the exam will be missed. Arrangements will be made for students who have a valid excused absence verified by the dean's office.

FINAL PROJECT: There will be a final project where you will pick a biochemistry paper of your choice as a group of 3-4 students and create a 10-15 minute presentation on the paper. The presentation rubric and instructions will be given by the 5th week of the semester.

ADDITIONAL RESOURCES

Accommodation of Disabilities: Office of Accessibility Resources and Services, **OARS (formerly known as Disability Support Services)** offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT. See <https://www.njit.edu/studentsuccess/node/5> to learn more about their services.

If you are in need of accommodations due to a documented disability, please contact the Office of Accessibility Resources and Services 973-596-5417 or via email oars@njit.edu

The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations is required to receive accommodations on assignments or exams. Eligible students requiring special conditions for exams must fill out an [OARS forms](#) stating the date and time of the exam. It is advisable for eligible students to fill out forms for the two common exams the first week of classes

Mental Health and Well-being: NJIT is committed to the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Center for Counseling and Psychological Services (c-CAPS) at <https://www.njit.edu/counseling/> or by calling the c CAPS office at 973-596-3414. If you need support and information about options and resources, please also reach out to the Office of the Dean of Students at <https://www.njit.edu/dos/>

IMPORTANT DATES: (See [Spring 2025 Academic Calendar](#))

January	20	Monday	Martin Luther King, Jr. Day
January	21	Tuesday	First Day of Classes
January	25	Saturday	Saturday Classes Begin
January	27	Monday	Last Day to Add/Drop a Class
January	27	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
January	28	Tuesday	W Grades Posted for Course Withdrawals
February	3	Monday	Last Day for 90% Refund, Full or Partial Withdrawal, No Refund for Partial Withdrawal after this date
February	17	Monday	Last Day for 50% Refund, Full Withdrawal
March	10	Monday	Last Day for 25% Refund, Full Withdrawal
March	16	Sunday	Spring Recess Begins - No Classes Scheduled - University Open
March	22	Saturday	Spring Recess Ends
April	3	Thursday	Wellness Day - No Classes Scheduled - University Open
April	7	Monday	Last Day to Withdraw
April	18	Friday	Good Friday - No Classes Scheduled - University Closed
April	20	Sunday	Easter Sunday - No Classes Scheduled - University Closed

May	6	Tuesday	Thursday Classes Meet
May	7	Wednesday	Friday Classes Meet
May	7	Wednesday	Last Day of Classes
May	8	Thursday	Reading Day 1
May	9	Friday	Reading Day 2
May	10	Saturday	Final Exams Begin
May	16	Friday	Final Exams End
May	18	Sunday	Final Grades Due
May	19	Monday	Master's and PhD Candidate Commencement - Bloom Wellness and Events Center
May	21	Wednesday	Undergraduate Candidate Commencement - Prudential Center

Course Outline

Week	Topic	Homework
1	Biochemistry Overview, Water	Homework 1
2	Amino acids and peptide bonds	Homework 2
3	Proteins	Homework 3
4	Hemoglobin: portrait of a protein Enzyme-Kinetics and specificity	Homework 4
5	Metabolism and Glycolysis	Homework 5, Review for exam
6	Mid-term exam	
7	The TCA Cycle	Homework 6
8	The Electron Transport Chain	Homework 7, Review for exam
9	Carbohydrates	Homework 8
10	Lipids	Homework 9
11	Nucleic acids, structure function	Homework 10
12	Overview of Biological Information Transfer	Homework 11
13	Final Presentations	
14	Review for Final	
15	Final Exam	

Updated - 2025