NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

Chemistry 473

Spring 2025 Course Syllabus

COURSE INFORMATION

Course Description: Chem 473
Number of Credits: 3
Prerequisites: C or higher in Chem 244
Course-Section and Instructor:

Course-Section	Instructor
Chem 473	Dr. Bhavani Balasubramanian

Days and Times
Tuesdays 4:00 am -5:20 pm, CULM LECT 1 Thursdays 4:00 am -5:20 pm, CULM LECT 1

Required Textbook:

Title	Biochemistry
Author	Reginald H Garrett and Charles M. Grisham
Edition	Fifth or sixth
Publisher	Cengage
ISBN #	ISBN-13: 9781133106296 (fifth) ISBN 13: 9781305577206 (sixth)

Office Hours: Wednesday virtual/in-person: 9:30 am-10:30 am
https://njit-edu.zoom.us/my/balasubr
Thursday in person starting week of Sep 14th: 2:00pm- 3:30 pm

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

University-wide Withdrawal Date: The last day to withdraw with a **W** is Monday, November 10, 2025

Learning Outcomes:

1. Recall fundamental chemical concepts of acids, bases, equilibria, kinetics, thermodynamics and electrochemistry from General Chemistry
2. Explain basic elements of structure of amino acids, proteins, nucleic acids, carbohydrates and lipids
3. Describe higher order structure in proteins and relate it to function
4. Illustrate examples to demonstrate that structure determines function
5. Demonstrate the role of the intermolecular forces in macromolecular structure and function
6. Apply knowledge of chemical kinetics in understanding enzyme catalysis and mechanism
7. Interpret kinetic data and identify types of enzyme inhibition
8. Write and describe the key biosynthetic pathways in living systems
9. Apply thermodynamic principles to understand energy production in biological systems
10. Discuss Electron transport and energy production
11. Discuss biochemical processes: replication, transcription, translation
12. Explain biosynthesis of carbohydrates, proteins

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.

In addition, obtaining course materials such as past exams or solutions to homework and/or class assignments from external sources constitutes as cheating. The official Student's Solutions Guide is exempt. Posting of course materials on external websites without the approval of the instructor violates intellectual property laws and hence strictly forbidden. Any student caught cheating on homework will be assessed a penalty of 20 points, in addition to a grade of zero for the given homework assignment.

Attendance Policy: Attendance at classes will be monitored through class work that will be collected and checked. Each class is a unique learning experience that cannot be replicated through simply "getting the notes."

Lecture: Class participation is an important part of the course and is expected of every student. If you are in class, but using a cell phone in any way, using a computer, or listening to music you will not benefit from the lecture. The slides are not a substitute for paying attention and taking notes in class.

In class worksheets: You are expected to come prepared to each class period by reviewing the textbook/slides in Canvas. During each class period, the students may be given a quiz or worksheet to solve. The worksheets will be graded so the instructor can gauge the student's comprehension of the material. Students who require further clarification are requested to come to office hours for help.

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

Homework/Class participation	150
Midterm Exam I	100
Midterm Exam II	100
Midterm Exam III	100
Final Exam	150
Total points	600

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

A	>535	C	360-409
B+	495-534	D	310-359
B	455-494	F	< 310
C+	410-454		

Exams: There will be three midterm exams held in class during the semester and one comprehensive final exam according to the dates listed below

Exam I	**Sep 30th , 2025**
Exam II	**Oct 30th , 2025**
Exam III	**Nov 25th, 2025**
Final Exam	**TBD**

The final exam will test your knowledge of all the course material taught in the entire course.

Test Grading Error. If you believe there is an error, you have until the end of the week following the return of test to submit for regrading. You must write a very brief description of the problem on the back of the test.
All errors need to be brought to the instructor's attention when they occur. Do not wait until the end of the semester.
Makeup Exam Policy: There will normally be no makeup for missed classwork or EXAMS during the semester. In the event that a student has a legitimate reason for missing class 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. One make-up examination will be permitted in the semester if there is an acceptable and substantial reason. A grade of zero will be given for a second missed examination independent of reason.
Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times. Such devices must be stowed in bags during exams or quizzes.

Homework Policy:
All homework must be submitted on time. You will have short weekly homework and three large homework assignments which will assigned 10 days before each exam and can be done in a group. I encourage you all to make sure that you UNDERSTAND all the problems in the homework assignments as these will be important for your exams. There is no credit for late homework. DO NOT WAIT TO THE LAST MINUTE TO DO YOUR HOMEWORK. PLAN TO FINISH YOUR HOMEWORK AT LEAST ONE DAY BEFORE IT IS DUE.

Course Learning Responsibility: You will be regularly assigned homework and or 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. In addition, we will be following the University's guidelines on academic integrity.

NJIT guidelines for Academic Integrity:
"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 code of Academic Integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Office of the Dean of Students. 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 Office of the Dean of Students at dos@njit.edu."
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.

Generative AI: *Student use of artificial intelligence (AI) is permitted in this course for certain assignments and activities. Additionally, if and when students use AI in this course, the AI must be cited as is shown within the NJIT Library AI citation page for AI. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments. More information about the use of AI in the class guide is also available on the AI Teaching and Learning Working Group website.*

NJIT Policy on Student Absences for Religious Observances
NJIT does not cancel classes for non-federally recognized religious holidays. NJIT is committed to supporting students observing religious holidays. Students must notify their instructors in writing of any conflicts between course requirements and religious observances, ideally by the end of the second week of classes and no later than two weeks before the anticipated absence.

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/

- http://www5.njit.edu/studentsuccess/disability-support-services/

ADDITIONAL RESOURCES

Accommodation of Disabilities: **O**ffice of **A**ccessibility **R**esources and **S**ervices, **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

How to succeed in the course:

You are responsible for utilizing the resources provided like pre-recorded lectures to help yourself learn. You will benefit from the lecture only if you come prepared to class. Before class, review lecture slides and come prepared with questions. After each class review notes, and make sure your doubts are clarified . Please plan to spend at least 6 hours each week outside the lecture period for this class. Please visit instructor office hours for additional help.

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In the classroom:

a) Arrive on time: The first few minutes will involve " Class recall" an activity that is essential for clarifying concepts.
b) Pay attention during lecture—find a way to stay engaged. It is easy to tune out, stay focused by taking notes and asking questions
c) Be curious—ask questions
d) Participate in class discussions

Outside the classroom, on a weekly basis, you need to plan for:

a) Time to listen to pre-recorded lectures if any (before the class) and review the textbook chapter
b) Prepare questions to ask the professor during class
c) Review material and come prepared to be engaged in the classroom
d) Time to do the online homework and quizzes and assigned problems

Exams: Study guides will be provided before each exam. It is your responsibility to do them: you can work in groups and consult with each other to answer the questions. Make sure you understand the material as your exams will test you on your understanding.

IMPORTANT DATES: (See Fall 2025 Academic Calendar)

Sept	**1**	**Monday**	**Labor Day. University Closed**
Sept	2	Tuesday	First Day of Classes
Sept	8	Monday	Last Day to Add/Drop a Class
Sept	8	Monday	Last Day for 100% Refund, Full or Partial Withdrawal
Sept	9	Tuesday	W Grades Posted for Course Withdrawals

Sept	15	Monday	Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date
Sept	29	Monday	Last Day for 50% Refund, Full Withdrawal
Oct	2	Thursday	Wellness Day
Oct	20	Monday	Last Day for 25% Refund, Full Withdrawal
Nov	10	Monday	Last Day to Withdraw from Classes
Nov	25	Tuesday	Thursday Classes Meet
Nov	26	Wednesday	Friday Classes Meet
Nov	27	Monday	Thanksgiving Recess Begins. No Classes
Nov	30	Friday	Thanksgiving Recess Ends
Dec	11	Thursday	Last Day of Classes
Dec	12	Friday	Reading Day
Dec	13	Wednesday	Saturday Classes Meet
Dec	14	Sunday	Final Exams Begin
Dec	20	Saturday	Final Exams End
Dec	22	Monday	Final Grades Due

Course Outline

This is a first part in a two course Biochemistry sequence. It is expected that the student will have reviewed concepts in general Chemistry before starting this course.

Week	Outcomes		Assignment
1	1	Chapters 1-3 Foundations of Biochem: Water	Classwork 1
2	2	Chapters 1-3 Foundations of Biochem: Thermodynamics, Living systems	Classwork 2
3	3,4,5	Chapter 4: Amino acids and the peptide bond	Classwork 3
4	2,3,4,5	Chapter 5 and 6: Proteins	Classwork 4
5		**EXAM 1: Chapters 1-6**	Classwork 5
5	6,7	Chapter 13: Enzymes-Kinetics and specificity	
6	6,7	Chapter 13: Enzymes-Kinetics and specificity	Classwork 6
7	2,4,5	Chapter 7: Carbohydrates	Classwork 7
8	2,4,5	Chapter 8: Lipids Chapter 9: Membranes	Classwork 8
9		**EXAM 2: Chapters 7-9, 10-11**	Classwork 9
9	2,8,9	Chapter 17 : Metabolism and glycolysis	
10	2,8,9	Chapter 18: Glycolysis	Classwork 10
11	9, 10	Chapter 19: TCA cycle	Classwork 11
12	9, 10	Chapter 20: Electron transport	Classwork 12
13		**EXAM 3: Chapters 17, 18, 19**	
14	2,4,5	Chapter 10-11: Nucleic acids, structure function	Classwork 13
15	11	Chapter 28, 29,30: Overview of Biological information transfer	Classwork 14
16	1 - 12	FINAL EXAM	