**Towson University**
**Biochemistry I – CHEM 351**
Syllabus – Spring 2025

***Class Times and Location***
CHEM 351-002: Monday and Wednesday from 2:00 pm to 3:15 pm
Location: Science Complex, Room 3333

***Instructor***
Dr. Ana Maria Soto
E-mail: asoto@towson.edu
Office: Science Complex 5301C
Phone: 410-704-2605

***Office Hours (Student Hours)***
*Office Hours*: Monday & Wednesday 3:30 – 4:30 pm (come to my office – no appointment needed)
*By appointment:* If you are not able to come to my office hours, we can make a short appointment at another time.

***Recommended Textbooks***
1. Lehninger Principles of Biochemistry, David L. Nelson & Michael M. Cox, 8th Ed, 2021, W.H. Freeman
2. Jakubowski, H. and Flatt, P. Fundamentals of Biochemistry*
3. Ahern, K. and Rajagopal, I., Biochemistry Free & Easy*
4. Ahern, K, Rajagopal, I and Tan, T, Biochemistry Free for All*

* Books 2, 3, 4 are available at LibreTexts: https://bio.libretexts.org/Bookshelves/Biochemistry

**Course Objectives and Pre-requisites**
The objective of this course is to provide an overview of (i) the chemistry of the major biological molecules, (ii) the processes in which these molecules participate and (iii) the coordinated cellular activities in which living organisms obtain chemical energy. At the end of the course the students should have developed sufficient background to study more advanced biochemistry topics if they wish. Prerequisite: CHEM 330 or CHEM 332 or (CHEM 333+333L) or (CHEM 337+CHEM 336)

**Wellness Resources for Students**
*Counseling Center*: Many services are available either in-person or remotely. Appointments are made on the same day (M-F 8:00 am to 5:00 pm). Visit https://www.towson.edu/counseling/ , call 410-704-2512 or email counseling@towson.edu
*Accessibility and Disability Services*: Promotes equal participation and full access by providing accommodations to students who need them. Email TUADS@towson.edu or call 410-704-4247 or visit https://www.towson.edu/accessibility-disability-services/
*Student Outreach and Support*: Connects students with support and resources to help students overcome challenges. Visit https://www.towson.edu/studentaffairs/student-outreach-support/ or call 410-704-4462 or email sos@towson.edu

**Chemistry Department Statement on Classroom Diversity and Inclusion**
The students, faculty, and staff at Towson University represent a diverse and vibrant community of learners and scholars. As a community, we value the unique contributions of each individual and promote active participation in all aspects of the learning process by each community member. Your

instructor supports Towson University's goal of fostering a diverse and inclusive educational setting. Your instructor strives to create an educational environment built upon the principles of mutual respect and support. Toward this end, all members participating in this course are expected to demonstrate respect for all other members of the class, both within and outside of the classroom. If you feel these expectations have not been met, please speak with your instructor or the designated diversity liaison, Dr. Cindy Zeller (czeller@towson.edu).

For further information regarding the diversity and inclusion policies of Towson University, please see Towson University's Office of Inclusion and Equity, the Fisher College of Science and Mathematics Diversity Action Plan, and the Chemistry Department Diversity Action Plan.

http://www.towson.edu/about/diversity.html
http://www.towson.edu/fcsm/diversity/
http://www.towson.edu/fcsm/departments/chemistry/diversity.html

***Blackboard, E-mail and Additional Materials***

- Several course materials will be posted on Blackboard (https://blackboard.towson.edu). I will contact you by e-mail to communicate changes in the tentative course schedule or other important course information. Please check your Towson e-mail account frequently as some of this information may be critical for the course.
- Additional materials (practice problems, handouts and videos) may be posted on Blackboard to support your learning. These materials are designed to help you understand the topics covered in class but are NOT a replacement of the class. Exams and quizzes are based on the topics covered in class. You are expected to attend every class and are responsible for all the material covered in class.

**Grading Policies**

The final grades and final letter grades will be determined as follows:

Final exam (17.5%): Comprehensive examination.
3 partial exams (51%): Each exam accounts for 17% of the final grade.
3 Quizzes (18%): Each quiz accounts for 6% of the final grade.
3 Homework-Quizzes (13.5%): Homework assignments will be posted on Blackboard. The homework quiz will contain ***one*** of the homework questions, to be solved during the first 10 minutes of class without consulting notes.

| Letter Grades will be assigned according to this scale: | |
|---|---|
| A: 93 – 100 | C+: 77 – 79 |
| A-: 90 – 92 | C: 70 – 76 |
| B+: 87 – 89 | D+: 67 – 69 |
| B: 83 – 86 | D: 60 – 66 |
| B-: 80 – 82 | F: 59 or below |

***Public Health Related Policies***

- Our class will follow university guidelines and CDC recommendation regarding any public health crisis, including COVID-19. As of August 25, 2024, masks are not required at Towson University. If guidelines change, our class will adhere to the most current recommendations.
- Students can make up any exam or quiz they miss due to public health protocols (with appropriate documentation). Please read the *Make-Up Policies* section below.

**Make Up Policies**

- Students missing an exam or quiz due to a justified or unjustified absence may arrange a make-up opportunity directly with me. In the case of justified absences (with appropriate documentation) students may take a make-up examination for full credit. In the case of unjustified absences, a late penalty will be applied to the make-up examination. If the make-up opportunity is arranged for the same day, a 3% penalty will be applied to the quiz or exam in question. If the make-up opportunity is arranged for a later day, a late penalty of 5% for the first day and additional 3% for every day late will be applied to the grade of the first make-up examination. If a student misses a second examination due to an unjustified absence, a late penalty of 5% will be applied to make-ups taken on the same day, and a late penalty of 8% for the first day and additional 5% for every day late will be applied for make-ups taken on a later day. A third examination missed due to an unjustified absence cannot be made up. All days (including Saturday and Sunday) are counted when assigning a late penalty.
- Students arriving more than 5 minutes late to a quiz will be considered absent from the quiz and will need to arrange a make up opportunity, with the appropriate penalty. Students arriving late to an exam may complete the exam in the remaining time without a late penalty, unless other students have already finished and left the room. In that case, students will be considered absent and will need to arrange a make up opportunity, with the appropriate penalty. The same policies apply to the final exam.
- A missed examination should be made-up promptly, preferably within a day of the missed examination but no later than 7 days after the missed examination. After 7 days, make-up exams will only be allowed for documented circumstances beyond the control of the student. For example, if you were ill for 4 days including the day of the exam, you must make up the exam on the $5^{th}$, $6^{th}$ or $7^{th}$ day but if you were hospitalized for 10 days, you will be allowed to make up the exam on the $11^{th}$ day. Please communicate with me promptly before or after missing an exam so that reasonable arrangements for your specific circumstance can be made.

**Attendance Policy**

Students are expected to participate in the course through regular attendance at lectures. Attendance to lectures will not be used as a grading criterion; however, extra credit assignments may be available during class sessions. No make up opportunities will be available to students who miss these opportunities due to absences.

**Academic Integrity Policy**

Cases of academic dishonesty will be handled in accordance to the *Student Academic Integrity Policy* recommendations. Please visit the following website for more information on these policies:

https://www.towson.edu/about/administration/policies/03-01-00-student-academic-integrity-policy.html

Students who are found cheating will receive zero on the quiz or exam in question and a letter describing the incident will be sent to the *Office of Student Conduct & Civility Education* and to the Department Chairperson.

**Other policies**

If you need an accommodation due to a disability, a health issue or any another special circumstance, please contact me privately to discuss your specific needs. A memo from the Office of Accessibility and Disabilities Services (ADS) authorizing your accommodations may be needed.

**Tentative Summary of Contents**

| Week | Date | Lecture Topic | Exam, Quizzes & Homework |
|---|---|---|---|
| 1 | 8/25/25 | *(Please review sections 1.2 and 1.3 on your own: 1.2 Chemical Foundations; 1.3 Physical Foundations)*<br>13.1 Bioenergetics and Thermodynamics<br>2.1. Weak interactions in aqueous systems | |
| | 8/27/25 | 2.2 Ionization of acids, weak acids and weak bases | |
| 2 | 9/1/25 | Labor Day (no class) | |
| | 9/3/25 | 2.3 Buffering against pH changes<br>Drop/add period ends Wednesday, Sept 3, 2025 | |
| 3 | 9/8/25 | 3.1 Amino acids (properties; ionization) | Homework 1 quiz (Buffers) |
| | 9/10/25 | 3.2 Peptides and proteins<br>3.3 Working with proteins (purification) | |
| 4 | 9/15/25 | 3.4 The structure of proteins: primary structure<br>4.1 Overview of protein structure | Quiz 1 |
| | 9/17/25 | 4.2. Protein secondary structure<br>4.3 Protein tertiary and quaternary structure | |
| 5 | 9/22/25 | 4.3 Protein tertiary and quaternary structure<br>4.4 Protein denaturation and folding | |
| | 9/24/25 | **Exam 1 (Ch. 2, 3, 4)** | **Exam 1** |
| 6 | 9/29/25 | 5.1 Reversible binding of a protein to a ligand: Hemoglobin (online) | |
| | 10/1/25 | 5.1 Hemoglobin | |
| 7 | 10/6/25 | 5.1 Hemoglobin<br>6.3. Enzyme kinetics | Homework 2 quiz |
| | 10/8/25 | 6.3. Enzyme kinetics<br>6.3. Enzyme Inhibition | |
| 8 | 10/13/25 | 6.3. Enzyme Inhibition<br>6.2. How enzymes work | |
| | 10/15/25 | 6.2. How enzymes work | Quiz 2 |
| 9 | 10/20/25 | 6.4 Examples of enzymatic reactions | |
| | 10/22/25 | 7.1. Carbohydrates: Monosaccharides & disaccharide | |
| 10 | 10/27/25 | **Exam 2 (Ch 5, 6, 7)** | **Exam 2** |
| | 10/29/25 | 7.2 Polysaccharides | |
| 11 | 11/3/25 | 10.1 Storage lipids; 10.2. Structural lipids<br>11.1 The composition of membranes<br>Last day to withdraw: Monday, November 3, 2025 | |
| | 11/5/25 | 11.3. Solute transport across membranes<br>12.1 General features of signal transduction<br>12.2 G protein coupled receptors & 2nd messengers | Homework 3 quiz |
| 12 | 11/10/25 | 13.2. Chemical logic and Common Biochem reactions<br>13.3 Phosphoryl group transfer and ATP | |
| | 11/12/25 | 13.4. Biological oxidation reduction reactions | |
| 13 | 11/17/25 | 14.1 Glycolysis | |

| Week | Date | Lecture Topic | Exam, Quizzes & Homework |
|---|---|---|---|
| | 11/19/25 | 14.3. Fates of pyruvate under anaerobic conditions<br>14.4. Gluconeogenesis | Quiz 3 |
| 14 | 11/24/25 | 16.2 Reactions of the citric acid cycle | |
| | 11/26/25 | Thanksgiving – No Classes | |
| 15 | 12/1/25 | 16.2 Reactions of the citric acid cycle | |
| | 12/3/25 | **Exam 3 (Ch 10, 11, 12, 13, 14, 16)** | **Exam 3** |
| 16 | 12/8/25 | Review | |
| | 12/15/25 | **CHEM 351-002: Monday, Dec 15, 3:00 – 5:00 pm** | **Final Exam** |