

CHEM 333 Biophysical Chemistry

Fall 2021 Syllabus

Important Note: This syllabus, along with course assignments and due dates, are subject to change. It is the student's responsibility to check Canvas for corrections or updates to the syllabus. Any changes will be clearly noted in a course announcement or through email.

Instructor: Dr. Amanda Jonsson

Office: CBB 400

Office Hours: Each office hour will be held in person (mask required, one student at a time) in my office and via Zoom. Zoom links will be posted on Canvas for all office hours.

Monday: 10 – 11 a.m.

Tuesday: 11 a.m. – noon

Wednesday: 10 – 11 a.m.

Thursday: 11 a.m. – noon

Friday: 11 a.m. – noon

E-mail: ajonsson@uwsp.edu

*****The best way to contact me is by email*****

Instructor Schedule

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:00		Chem 366 CBB 131		Chem 366 CBB 131	Chem 366 CBB 131
9:00		<i>Prep</i>		<i>Prep</i>	<i>Prep</i>
10:00	Office Hour	Chem 333 CBB 131	Office Hour	Chem 333 CBB 131	Chem 333 CBB 131
11:00	Chem 101 Lab 01L4 CBB 220	Office Hour		Office Hour	Office Hour
12:00					
1:00					
2:00		Chem 105 Lab 02L1 CBB 226		Chem 105 Lab 02L2 CBB 226	Department Meetings
3:00	Meeting				
4:00					

Meeting Times

Lecture: Tuesday, Thursday, Friday 10 – 10:50 a.m. in room 131 of the Chemistry Biology Building

Course Description

Examine physiochemical principles underlying structure and chemical properties of macromolecules of biological importance, including principles of thermodynamics, equilibrium, kinetics, and dynamics. Includes methods for separation and isolation of macromolecules and their spectroscopic characterization.

Required Materials

Textbook

Physical Chemistry Principles and Applications in Biological Sciences, 5th Edition, Pearson, 2014. This book is available for rental at the University Bookstore.

Scientific Calculator

Your calculator must be able to do logarithms and exponents. You will not be allowed graphing calculators or any calculator with a QWERTY keyboard. Calculators that meet these requirements can be purchased at the University Bookstore, office supply stores such as Staples or Office Depot, or at other stores such as Target, Walmart, etc. for around \$10.

Course Learning Outcomes

1. Be able to explain the theory behind several spectroscopy techniques that are important in the biosciences.
2. Be able to interpret spectra/data from several experimental techniques that are important in the biosciences to provide molecular-level information about biochemical systems.
3. Be able to explain the fundamental laws of thermodynamics.
4. Be able to apply the theories and equations of thermodynamics to solve problems of chemical and biological interest.
5. Be able to apply knowledge of thermodynamics to explain phenomenon of chemical and biological interest.
6. Be able to explain how NMR is used to determine macromolecular structure.

Attendance

Before coming to class each day, you should read through the assigned reading (rarely more than 10 pages and often with many pictures/tables). I do not expect that you understand all the material before coming to class; however, I do expect that you are familiar enough with the material that we can discuss it without having to stop to define each new word. **Reading physical chemistry texts is really, really hard! Chances are, things won't make much sense until after lecture, but skimming the material before class is a good way to figure out what we will be talking about in class.**

During class I expect that you pay attention (to the best of your abilities), refrain from using other technology (phones, tablets, laptops, etc.) in a disruptive way, and participate in class discussions and activities.

Participation is not awarded its own grade, but in my experience students who participate in class tend to do better than those who do not.

Make-Up policies

I do not have a formal attendance policy for this course. In my experience, students who do not come to class do not do well in the course. **Late assignments will be accepted with a 10% late penalty per business day it is late.** The most important thing is to communicate with me so we can work out a way forward that works for both of us.

Recommended study habits and tips

Physical chemistry (at its worst) takes everything you hated about physics, calculus, and general chemistry and combines it into one course. At its best, it allows you to predict and rationalize the behavior of molecules, understand physicochemical phenomenon, and determine structure and function for macromolecules. Many students find physical chemistry to be one of the most challenging courses they take as an undergraduate. Fortunately, there are things you can do to help make your experience a good one.

- Before coming to class each day, review your notes from the previous day. You don't need to spend much time on this (5 – 10 minutes), but it will remind you of what we have covered and of any questions you would like cleared up before we move on to new material.
- When taking notes in class leave white space so you can go back and fill in gaps later. After class, sit down with a friend and compare notes. Fill in the things you are missing. When you are done read through your notes and see if they make sense. If not, talk to a friend, reread sections of the book, or talk to the professor to keep filling in the gaps until things make sense.
- Do as many problems as possible! On assignments and exams, I won't be asking you how you feel about chemistry, I'll be asking you to answer/solve chemistry problems. In order to do that you need to know how to answer/solve chemistry problems. The best way to learn this, or any other skill, is practice, practice, and more practice!
- Work with others, but make sure you can do the problems on your own. Working together is a great way to learn. It allows you to talk over your ideas with others and come to conclusions you may not have reached on your own. Despite the benefits working with others can be harmful if you are allowing the others in the group to carry you. Unless you understand how to do the problems on your own you will fail the exams and you will likely fail the course.

Grading

Your grade in this course will come from the following components:

Research Paper, News Article, and Presentation (40%)
 Group and Individual Projects (30%)
 Journal Clubs (20%)
 Assignments, Review, and Quizzes (10%)

Your final grade in the course will be determined using the following scale (please note that the instructor reserves the right to lower these cut-offs, but will never raise them)

$93 \leq A \leq 100$		$90 \leq A- < 93$	
$87 \leq B+ < 90$	$83 \leq B < 87$	$83 \leq B- < 80$	
$77 \leq C+ < 80$	$73 \leq C < 77$	$70 \leq C- < 73$	
$67 \leq D+ < 70$		$63 \leq D < 67$	
$F < 63$			

Pop Quizzes: The instructor reserves the right to offer pop quizzes if it becomes clear that students are not coming to class prepared or not keeping up with work outside of class.

Homework: No graded homework will be given out in this class; however suggested problems will be given out with each study guide to aid in understanding. Final answers to all numeric problems will be given so you can check your work. Detailed solutions will be posted on Canvas.

Rights and Responsibilities

UWSP values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to succeed, we have developed a set of expectations for all students and instructors. This set of expectations is known as the *Rights and Responsibilities* documents, and it is intended to help establish a positive living and learning environment at UWSP. Click here for more information:

<https://www.uwsp.edu/dos/Pages/handbook.aspx>

Academic Misconduct

I encourage students to work and study in groups. However, any work submitted for a grade must reflect your own work and understanding of the material. Academic dishonesty will be dealt with following the rules on academic misconduct in the current [UWSP student handbook](#) (UWSP Chapter 14) and, at a minimum, a score of 0 on the assignment. Egregious and/or repeated problems will result in an F in the course. Each student is expected to act with honesty and integrity, and must respect the rights of others to

learn in a safe, respectful and inviting environment. *Please do not hesitate to contact me if you have any questions or concerns.*

Inclusivity Statement

It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally, or for other students or student groups.

If you have experienced a bias incident (an act of conduct, speech, or expression to which a bias motive is evident as a contributing factor regardless of whether the act is criminal) at UWSP, you have the right to report it using this [link](#). You may also contact the Dean of Students office directly at dos@uwsp.edu.

I commit to doing my part as well by keeping myself informed on the most recent research and practices that best support inclusive learning. I last completed UWSP's SafeZone training in April 2020.

Equal Access for Students with Disabilities

UWSP will modify academic program requirements as necessary to ensure that they do not discriminate against qualified applicants or students with disabilities. The modifications should not affect the substance of educational programs or compromise academic standards; nor should they intrude upon academic freedom. Examinations or other procedures used for evaluating students' academic achievements may be adapted. The results of such evaluation must demonstrate the student's achievement in the academic activity, rather than describe his/her disability.

If modifications are required due to a disability, please inform the instructor and contact the [Disability and Assistive Technology Center](#) to complete an Accommodations Request form.

TENTATIVE Course Schedule

NOTE: All dates are extremely tentative. Updated timelines and assignment due dates will be available in Canvas.

Unit 1: Thermodynamics, approximately weeks 1 – 5, including the following activities:

- Journal Club #1 (9/28)
- Group Project #1 (9/30 – 10/1)

- Individual Project #1 (10/5)

Unit 2: Spectroscopy, approximately weeks 6 – 10, including the following activities:

- Journal Club #2 (10/19)
- Journal Club #3 (11/2)
- Group Project #2 (11/4 – 11/5)
- Individual Project #2 (11/9)
- Group Project #3 (11/11 – 11/12)
- Individual Project #3 (11/16)

Presentation and the literature assignments (weeks 12 and 13)

Unit 3: NMR, approximately weeks 14 – 15, including the following activities:

- Group Project #4 (12/7 – 12/10)
- Individual Project #4 (12/15 during final exam period, 12:30 – 2:30)