

Chemistry 333 - Biophysical Chemistry

Spring 2021

Dr. Erin D. Speetzen

Contact Information

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Office Hours -

Mondays 2 - 3 p.m.
Tuesdays 2 - 3 p.m.
Wednesdays 2 - 3 p.m.
Thursday 11 am - 12 p.m.
Friday 11 am - 12 p.m.
You can also email me to set up an appointment

The best way to reach me is via my university email. I check my email periodically throughout the workday. I do not check email at night or during the weekend.

Meeting Times

Lecture: Tuesday, Thursday, Friday 10 - 10:50 a.m. - Synchronous Zoom sessions.
Attendance on Tuesdays and Thursdays is expected. Attendance on Fridays is up to individuals/groups.

Prerequisites

Math 120, Physics 204 or 250, Chem 365, and accepted biochemistry major or consent of chair.

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 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.

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 interpret 2-dimensional NMR data and apply it to the structure of macromolecules.

Preparation/Participation

Before coming to class each day you should watch the lecture videos, which will be posted on Canvas. You should take notes on these videos as you would if you were in lecture.

During class you will be working in groups on activities and problems related to the lecture videos. Some of these activities may be graded and I may not announce in advance when an activity will be collected and graded.

Make-Up policies

I do not have a formal attendance policy for this course, however in my experience, students who do not come to class do not do well in the course. I expect that students will turn in assignments when they are due and will communicate with me **in advance** if they cannot meet a deadline.

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 its 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: Literature Assignments (40%), Journal Clubs (20%), Group Projects (10%), Individual Projects/Quizzes (20%), In-Class Activities/Problems (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)

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

Literature Assignments - Over the course of the semester you will be doing a number of assignments in which you use the primary literature to investigate a topic of your choose in detail. In these assignments you will practice oral and written presentation skills as well as writing for scientific and non-scientific audiences. Details about each assignment and their point totals will be provided as they are assigned,

Journal Clubs – You will be reading and analyzing a number of journal articles over the course of the semester. Each article will focus on an experimental technique (or techniques) that we have discussed in class and you will be given a set of instructor-provided questions to help guide you through the article. You will have the opportunity to discuss the articles with your peers and ask questions of the instructor before submitting your assignments.

Group Projects – You will complete a series of group projects that require you to analyze and interpret experimental data from many of the methods we talk about this semester. The purpose of these projects is to give you hands-on experience in data interpretation and to deepen your understanding of these methods, what they can be used for, and what they can tell us. These projects are meant to be learning opportunities and you will be allowed to work in groups and get help from the instructor to complete them.

Individual Projects/Quizzes – You will complete a general chemistry and math review quiz as well as individual projects/quizzes for each group project that you complete. These quizzes will allow you to show case what you have learned by completing each project. Pop-quizzes may be added if it becomes clear that students are not well-prepared for class.

In-Class Activities/Problems – Periodically you will turn in activities from lecture or problems I assign to illustrate that you understand the theory behind the content we are covering. These activities/problems may be done in groups or individually and will be open-note, open book.

Academic Misconduct

The definition of academic dishonesty and the associated consequences can be found at <https://www.uwsp.edu/dos/Documents/AcademicIntegrityBrochure.pdf>

Disability Services

The Americans with Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities. If you have a disability and require classroom or exam accommodation, please register with the Disability and Assistive Technology Center and then contact me.

In order to receive accommodations, you must have documentation of your disability on file with the Disability and Assistive Technology Center.

Important Dates

Jan. 25	Classes Begin
Feb. 3	Last day to drop a 16-week course without a grade
Mar. 19	Spring break begins at 6 p.m.
Mar. 29	Classes resume
Apr. 23	Last day to drop a 16-week course.
May 14	Last day of class