

# Chemistry 335 – Physical Chemistry

## Fall 2018

### Dr. Erin D. Speetzen

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#### Contact Information

Office: CBB 402 (Chemistry Biology Building)  
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The best way to reach me is via my university email.

#### Meeting Times

*Lecture:* Tuesday, Thursday and Friday 10:00 – 10:50 a.m. Room 261 (CBB)

*Lab:* Monday (section 1) or Wednesday (section 2) 2:00 – 4:50 p.m. Room 476 (CBB)

#### Office Hours:

Monday 12 - 1 p.m., Tuesday 11 a.m. – 12 p.m., Wednesday 12 – 1 p.m., Thursday 3 – 4 p.m., Friday 11 – 12 p.m. or by appointment.

#### Prerequisites

CHEM 248, CHEM 326, MATH 222, and PHYS 250; or Instructor Consent

#### Required Materials

##### Textbook

Lecture Text: Ball, D. W. (2015) *Physical Chemistry* (2<sup>nd</sup> ed.) Stamford CT: Cengage.

Lab Text: Garland, C. W., Nibler, J. W., Shoemaker, D. P. (2003) *Experiments in Physical Chemistry* (7<sup>th</sup> ed.) New York, NY: McGraw Hill.

Non-Graphing Scientific Calculator

Lab Notebook

#### Course Description

Catalog description: Laws and principles of physical chemistry including atomic and molecular structure, thermodynamics, kinetics.

Note that this description covers both 335 and 336. Chem 335 covers primarily thermodynamics and kinetics and will focus on chapters 1 – 8, 19 and 20 of the lecture text. Lab will focus on experiments related to thermochemical and electrochemical measurements, kinetics, and bulk properties of matter.

#### Course Learning Outcomes

The Learning Outcomes (LO) for Chem 335 are derived from the Chemistry Department's Eight Program Learning Outcomes (PLO) and from UWSP's Learning Outcomes for Communication in the Major (CitM).

- 1) Students will learn the foundational principles of classical chemical thermodynamics and kinetics and apply them to both theoretical and practical problems. This LO is derived from PLO #1 and is focused on the lecture portion of the course. In many cases, students will learn the origins of the equations that were presented in General Chemistry.
- 2) Students will learn how to collect and analyze experimental data, draw conclusions, and present their results. This LO is derived from PLOs #2, 3, 5, 6, 7, and 8 which are based on the laboratory portion of the course.

Communication in the Major (CitM) has two learning outcomes. Both of them are addressed in Chem 335 and they are listed below.

- Apply discipline-specific standards of oral and written communication to compose an articulate, grammatically correct, and organized presentation/piece of writing with properly documented and supported ideas, evidence, and information suitable to the topic, purpose, and audience.
- Critique their own and others' writing/oral presentations to provide effective and useful feedback to improve their communication.

## Grading

<b>Lecture (75%)</b>		
	3 Midterm Exams @ 100 pts each	300 pts
	Final Exam 150 pts	150 pts
	Assignments	150 pts
	Subtotal	600 pts
<b>Laboratory (25%)</b>		
	Error Analysis Quiz	65 pts
	8 Short Reports @ 5 pts each	40 pts
	Notebook	20 pts
	Final Exam	75 pts
	Subtotal	200 pts
<b>Course Total</b>		800 Points

Assignments may include problems sets, literature reports, or other assignments as the instructor sees fit. In the event that more (or fewer) than 150 points are assigned over the course of the semester your assignment scores will be scaled as appropriate.

Periodically, Communication in the Major Assignments will be distributed in lecture and/or lab **for the chemistry majors**. The purpose of these assignments is to help you gain proficiency in different areas of oral and written communication. As such, you will be allowed to resubmit these assignments until they are judged to be satisfactory. No points will be awarded for these assignment, however, penalties will be assessed if you fail to complete them. An information sheet with specifics for each assignment, including penalties will be provided for each activity.

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).

A ≥ 90%	A- ≥ 88%	
B+ ≥ 86%	B ≥ 77%	B- ≥ 75%
C+ ≥ 73%	C ≥ 63%	C- ≥ 61%
D+ ≥ 59%	D ≥ 50%	
F < 50%		

## Attendance, Absences and Make-Ups

***Make-up exams will not be allowed, except under special circumstances with documentation. I consider the following special circumstances (please talk to me if you have other special circumstances that you feel deserve consideration):***

- UWSP athletic event (I require **written** authorization from your coach)
- Armed forces related training or drills (I require **written** authorization from a supervising officer)
- Medical emergency (I require **written** authorization from a physician)
- Death in the family (I require documentation of some type; an obituary or service folder is acceptable)

## **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.

## **Academic Misconduct**

The definition of academic misconduct can be found starting on page 11 of the document found at: <http://www.uwsp.edu/dos/Documents/CommunityRights.pdf>

Students found to have engaged in academic misconduct on problem sets will receive a score of zero on the assignment for the first offense and an F in the course for the second offense. Students found to have engaged in academic misconduct on an exam may receive a grade of F for the course.

## **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 Disabilities Services office and then contact me.

In order to receive accommodations, you must have documentation of your disability on file with the Office of Disability Services. In addition, you must provide me with an Accommodations Request Form (available at the website). You must have me sign the form and return it to the Office of Disability Services.

## **Suggestions for Course Success**

- 1. Read the textbook and work through problems and derivations.**
- 2. Attend, participate and take notes at all lectures.**
  - Don't be afraid to answer questions or ask questions during class.
  - When taking notes, it is best to try and capture the key points instead of writing down word for word what we discuss. You can always go back later and fill in more detail.
- 3. Re-Read the section(s)** of the book after lecture and fill in your notes with additional details.
- 4. Do Lots of Problems.**
  - I encourage you to work together to solve problems, but make sure you are competent enough to solve problems from start to finish by yourself.
- 5. Work on physical chemistry a little bit every day.** Material in CHEM 335 can be challenging, it is in your best interest to continually work on this course and allow concepts to develop and solidify over time. It is best to start the problem sets early and give your brain time to digest the material.
- 6. Utilize helpful resources.**
  - Form study groups.
  - Come to my office hours.
  - If my office door is open, feel free to stop and ask questions. If you need to set-up a time to meet outside of my office hours, email me and we will find a time that works. Talking through physical chemistry problems can help develop intuition and allows you to see the big picture question and not get overly bogged down in the mathematics. Physical chemistry can be a difficult concept to grasp. I'm always willing to talk through problems and help you grapple with the material.
  - I'm here to facilitate your learning in this course. Success requires that you take personal responsibility to make sure you understand the material and seek resources to help you learn.

**Tentative Lecture Schedule**

The instructor reserves the right to change this schedule as needed. Any changes will be announced in advance via an in-class announcement.

Week	Chapter(s)	Exam
1 (9/3)	Review and Ch. 1 (Gases and the 0 <sup>th</sup> Law)	
2 (9/10)	Ch. 1 (Gases and the 0 <sup>th</sup> Law) and Ch. 2 (The 1 <sup>st</sup> Law)	
3 (9/17)	Ch. 2 (The 1 <sup>st</sup> Law) and Ch. 3 (The 2 <sup>nd</sup> and 3 <sup>rd</sup> Law)	
4 (9/25)	Ch. 3 (The 2 <sup>nd</sup> and 3 <sup>rd</sup> Laws)	
5 (10/1)	Ch. 4 (Gibbs Energy and Chem. Potential)	Oct 4 <sup>th</sup>
6 (10/8)	Ch. 4 (Gibbs Energy and Chem. Potential)	
7 (10/15)	Ch. 5 (Intro to Chem. Equil.)	
8 (10/22)	Ch. 5 (Intro to Chem. Equil.) and Ch. 6 (Equil. in Single Comp. Systems)	
9 (10/29)	Ch. 7 (Equil. in Multi-Comp. Systems)	Nov 1 <sup>st</sup>
10 (11/5)	Ch. 7 (Equil. in Multi-Comp. Systems) and Ch. 8 (Electrochemistry)	
11 (11/12)	Ch. 8 (Electrochemistry)	
12 (11/19)	Ch. 8 (Electrochemistry), No class Thursday or Friday (Thanksgiving Break)	
13 (11/26)	Ch. 19 (Kinetic Theory of Gases) and Ch. 20 (Kinetics)	Nov 29 <sup>th</sup>
14 (12/3)	Ch. 20 (Kinetics)	
15 (12/10)	Ch. 20 (Kinetics)	
16 (12/17)	<b>Monday December 17<sup>th</sup> - FINAL EXAM (8:00 – 10:00 a.m.)</b>	Dec 17 <sup>th</sup>