



## **Chemistry 563 – Physical Chemistry Laboratory (1 cr) Fall 2019**

### **Online Course Website**

The specific course website for each section can be accessed through the general canvas dashboard located at <https://canvas.wisc.edu>

### **Course Designations**

Breadth - Physical Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

### **Meeting Times**

All sections meet from 1:20-5:30p in room B200. 563-1 meets on Mondays, 563-3 meets on Tuesdays, 563-4 meets on Wednesdays, and 563-6 meets on Thursdays.

### **Instructional Mode**

The course is instructed with all sessions being face-to-face.

### **Credit Hour Completion**

The course follows the “45 hours per credit” definition where one credit is at least 45 hours of work throughout the semester. The total in-class time throughout the semester is 38 hours and the out-of-class participation is expected to be at least 7 hours, but likely to be approximately 20 hours.

## **Instructors and Teaching Assistants**

Prof. Gilbert Nathanson (nathanson@chem.wisc.edu) – Instructor for 563-1, 563-4

Dr. Mark Wendt (mark.wendt@wisc.edu) – Instructor for 563-3, 563-6

Mainak Mustafi (mustafi@wisc.edu) – Teaching assistant for 563-3, 563-4, 563-6

Rachel Hutchinson (rhutchinson3@wisc.edu) – Teaching assistant for 563-1

Office hours are 12:15-1:15p Monday through Thursday in room B221.

## **Course Description**

Principles of experimental physical chemistry applied to the acquisition of thermodynamic and kinetic data; use of basic physical laboratory equipment; related computations, analysis of errors, interpretation of results.

## **Requisites**

CHEM 561 or 565 or CBE 310

## **Textbook**

There is no textbook required for the course. Required reading material is provided by hard copies of handouts, and also provided electronically on the course website. Suggested readings are provided electronically on the course website.

## **Course Learning Outcomes**

Understand the quality and information content of experimental measurements.

Emulate the process by which new knowledge is generated.

Communicate scientific content in oral conversation.

Make connections between the physical chemistry laboratory experience and other courses.

## **Safety**

Eye protection (goggles, or safety glasses that include side protection) and closed-toe shoes are always required in the laboratory whenever any experiments are in progress. Goggles are available in the lab for student use, but you are encouraged to use your own. Other clothing choices are up to you but be aware that there are always dangers of stains, corrosive chemical spills, splashes, and broken glass when working in a chemistry laboratory.

## Graded Materials

- *Online quizzes*: There are three prelab quizzes worth 6 points each. These quizzes are due before the laboratory period on the assigned day. Your final score for each quiz is the highest score out of a maximum of three attempts.
- *Oral exams*: There are two oral exams worth 100 points each. You should be prepared to discuss the theory behind the experiment as well as specifics of your data and methods. Specific topics, details of the format, and the schedule will be discussed before the exam.
- *Written activities*: Most laboratory periods have a set of written activities that are to be submitted at the end of the period. There are a total of seven sets of these activities worth 34 points combined.
- *Evaluations*: There is a 3 point evaluation score for each of the first three days associated with each experiment (18 points total). This score is affected primarily by lab preparation, participation, hygiene, and timeliness.
- *Postlab discussions*: There is a 15 point evaluation score for each postlab discussion. This score is based on your presentation, participation during presentations by others, and submitted written work.

## Point Breakdown

Online quizzes (3)	= 18 pts
Oral exams (2)	= 200 pts
Written activities (7)	= 34 pts
Evaluations (6)	= 18 pts
Postlab discussions (2)	= 30 pts

*Total = 300 pts*

Letter grades for the oral exams and for the course are assigned based on the following scales:

<u>Oral Exams</u>		<u>Final Grades</u>	
A	90-100	A	279-300 (93%)
AB	80-89	AB	258-278 (86%)
B	70-79	B	237-257 (79%)
BC	60-69	BC	216-236 (72%)
C	50-59	C	195-215 (65%)
D	40-49	D	174-194 (58%)
F	<40	F	<174

## Schedule

(★ = online individual submission, ⊕ = hard copy individual submission, ☆ = hard copy group submission)

Week	Topic	Before Lab	During Lab	End of Lab
9/9	Numerical Treatment of Experimental Data	⇒ Read handout ⇒ Watch Excel primer videos ★ Take quiz	⇒ Introductions ⇒ Review of syllabus ⇒ TA discussion ⇒ Work on activities	⊕ Submit activities
9/16	Conductance	⇒ Read handout ★ Take quiz	⇒ TA discussion ⇒ Work on day 1 activities	☆ Submit day 1 activities
9/23	Conductance	⇒ Read day 2 activities	⇒ Work on day 2 activities	☆ Submit day 2 activities
9/30	Conductance	⇒ Read day 3 activities	⇒ Work on day 3 activities	☆ Submit day 3 activities
10/7	Conductance	⇒ Read day 4 activities	⇒ Summarize results on boards ⇒ Present results to class ⇒ Discuss concepts	☆ Submit day 4 activities
10/14	Conductance	⇒ Prepare for oral exam	⇒ <b>Oral exam</b>	
10/21	Kinetics	⇒ Read handout ★ Take quiz	⇒ TA discussion ⇒ Work on day 1 activities	☆ Submit day 1 activities
10/28	Kinetics	⇒ Read day 2 activities	⇒ Work on day 2 activities	☆ Submit day 2 activities
11/4	Kinetics	⇒ Read day 3 activities	⇒ Work on day 3 activities	☆ Submit day 3 activities
11/11	Kinetics	⇒ Read day 4 activities	⇒ Summarize results on boards ⇒ Present results to class ⇒ Discuss concepts	☆ Submit day 4 activities
11/18	Kinetics	⇒ Prepare for oral exam	⇒ <b>Oral exam</b>	