



## **Chemistry 564 – Physical Chemistry Laboratory (1 cr)**

### **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 1:20-5:20p in room B200 on days specified below:

Chem 564-001: Mondays

Chem 564-003: Tuesdays

Chem 564-004: Wednesdays

Chem 564-006: 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. Etienne Garand (egarand@wisc.edu) – Instructor for Chem 564-001 and Chem 564-004

Dr. Mark Wendt (mark.wendt@wisc.edu) – Instructor for Chem 564-003 and Chem 564-006

Wen-Tsung Huang (whuang75@wisc.edu) – Teaching assistant

Rachel Hutchinson (rhutchinson3@wisc.edu) – Teaching assistant

Dr. Schuyler Kain (skain@wisc.edu) – Faculty assistant

Hanming Yang (hyang366@wisc.edu) – Teaching assistant

Office hours for all sections are from 12:15-1:15p Monday through Thursday

## **Course Description**

Principles of experimental physical chemistry applied to the acquisition and interpretation of basic data on molecular structure and dynamics, and properties of macromolecules; principles and use of spectroscopic and other electronic instrumentation.

## **Requisites**

CHEM 562 and CHEM 563

## **Course Learning Outcomes**

Understand the fundamentals of spectroscopic techniques.

Understand the basics of instrumentation in relation to making an experimental measurement.

Communicate scientific content in oral conversation.

Make connections between quantum mechanics and qualitative physical descriptions.

## **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.

## **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 eight prelab quizzes worth 10 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 50 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:* There are eight sets of written activities worth 20 pts each.
- *Evaluations:* There is a 10 point evaluation score for eight of the laboratory periods (80 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 as well as participation during presentations by others.

## Point Breakdown

Online quizzes (8)	= 80 pts
Oral exams (2)	= 100 pts
Postlab discussions (2)	= 30 pts
Written assignments (9)	= 160 pts
Evaluations (8)	= 80 pts

*Total = 450 pts*

Final grades are intended to be assigned using the scale below.

<i>A</i>	405+
<i>AB</i>	387-404
<i>B</i>	360-386
<i>BC</i>	342-359
<i>C</i>	306-341
<i>D</i>	261-305
<i>F</i>	<261

## Schedule

Note that a complete list of activities to do before the start of each laboratory period is given in the Preparation subsection of each daily checklist in the handout for the experiment.

<b>Week</b>	<b>Schedule A</b>	<b>Schedule B</b>
1/29	NMR Day 1	Microwave Day 1
2/5	NMR Day 2	Microwave Day 2
2/12	NMR Day 3	Microwave Day 3
2/19	NMR Day 4	Microwave Day 4
2/26	NMR Day 5	<b><i>Microwave Oral Exam</i></b>
3/5	NMR Day 6	NMR Day 1
3/12	<b><i>NMR Oral Exam</i></b>	NMR Day 2
3/19	Microwave Day 1	NMR Day 3
3/26	<i>Spring Break</i>	<i>Spring Break</i>
4/2	Microwave Day 2	NMR Day 4
4/9	Microwave Day 3	NMR Day 5
4/16	Microwave Day 4	NMR Day 6
4/23	<b><i>Microwave Oral Exam</i></b>	<b><i>NMR Oral Exam</i></b>