

**Student Syllabus for Chemistry 339**  
**Physical Chemistry Lab II**  
**Spring 2018**

**Instructor:** Dr. David Szpunar  
Office: Science Building B129  
e-mail: [dszpunar@uwsp.edu](mailto:dszpunar@uwsp.edu)  
Phone: 715-346-3771

**Lab:** Tue., 2:00 PM -4:50 PM      **Location:** Science Building C141

**Text:**      **Required:** Garland, Nibler, and Shoemaker, “**Experiments in Physical Chemistry**”, 8<sup>th</sup> ed

- *ISBN-13: 978-0072828429*
- *ISBN-10: 0072828420*
- This is available for rental at the University Bookstore

Bound laboratory notebook A bound laboratory notebook with numbered pages solely used for CHEM 339 is required.

Scientific calculator (required)

**Office hours:**                      Wed. 2:00PM-3:00 PM  
   Fri. 11:00AM-12:00 PM

By appointment

## **COURSE DESCRIPTIONS (CHEM 336: Physical Chemistry II)**

### **Description:**

1 credit (Three hours of lab per week).

- Extension of 335 with an emphasis on the utilization of spectroscopic methods to probe the electronic structure of atoms and molecules and the nuclear motions within molecules. Introduction to the use of lasers in spectroscopy and kinetics.

### **Prerequisites:**

CHEM 335 (Chemistry 248 and 326; Mathematics 222; Physics 250).

## **COURSE OBJECTIVES**

### **Course Learning Outcomes**

Students completing Chemistry 336 will be able to:

- (a) Use good record keeping in a laboratory notebook.
- (b) Perform laboratory experiments to probe and understand the quantum mechanical nature of matter.
- (c) Analyze experimental data using model systems.
- (d) Understand the working properties of scientific instrumentation in the physical chemistry laboratory.
- (e) Effectively communicate experimental results through written reports.

### **Course Purpose**

The laboratory experiments for CHEM 339 will reinforce many of the topics covered in CHEM 336. As such, we will primarily use different forms of spectroscopy (Infrared, Raman, UV/Vis, Fluorescence, etc.) to understand the motion of electrons and nuclei in atoms and molecules. The quantum mechanical treatment of model systems will be applied to your results in order to understand the different spectra and derive molecular constants. In addition to understanding molecules and atoms using quantum mechanics, you will learn about some of the experimental tools utilized in many physical chemistry laboratories including computer controlled data acquisition, monochromators, photomultiplier tubes, CCD cameras, and continuous wave lasers.

**METHODOLOGY:** The class is composed of one 3-hour lab period per week. You will be broken down into groups of two. Each group will rotate through a series of 2 labs before submitting any lab reports (see detailed schedule below). One class period will be designated for work/lab write-ups for every two labs. The purpose of these work periods is to give you time to work on your lab reports while I am available to help you with any questions/problems that you might have. Even though we will not perform any labs during these lab periods, *you are responsible for attending these work sessions.*

**Attendance:** Attendance is expected as outlined in the UWSP Undergraduate Catalog. See the section about Attendance under Academic Policies.

**D2L:** Course information (e.g. supplementary lab information and handouts) will be posted daily on D2L. It is your responsibility to visit the site daily. You can log into D2L at: <http://www.uwsp.edu/d2l/Pages/default.aspx>

**Lab reports:** A lab report is due *for each lab performed*, making a total of 8 reports. Details of what is expected for each report will be posted on D2L each week. These reports consist of a brief introduction, experimental data provided in tabular format, any collected spectra with proper titles, axis labels, units, etc., and answers to any questions that were provided on D2L.

You will also be responsible for submitting one collective formal lab report based off experiments 4-6 (see list of experiments below). This lab report will be written in the format of a peer-reviewed scientific paper. You are responsible for submitting a mandatory rough draft of your formal report (Tuesday, May 1), while the formal report is due the day of the final exam (Thursday, May 17). Details and guidelines will be posted later in the semester on D2L.

**Make-up policy:** There will be **NO** unexcused make-ups of any labs.

**Final Exam:** In lieu of a final exam, you are responsible for a formal report (described above). See D2L for more information.

**Grading:** Your final grade will be based on the following point system:

Lab reports :	8 × 100 points	=	800 points	(80.0%)
Formal report:	1 × 200 points	=	200 points	(20.0%)
Total:	800+200	=	1000 points	(100%)

% Total Points	Grade	% Total Points	Grade
≥ 93 %	A	≥ 73%	C
≥ 90%	A-	≥ 70%	C-
≥ 87%	B+	≥ 67%	D+
≥ 83%	B	≥ 63%	D
≥ 80 %	B-	< 63 %	F
≥ 77%	C+		

**Lab policies:**

You are expected to be at class on time.

Attendance is covered in the Methodology section above.

You are responsible for reading the lab to be performed as well as any supplementary material *before* arriving in lab. Failure to read any and all pertinent material will result in your removal from that week's lab. You will not be given the opportunity to make up any of the missed material/labwork.

UWSP is committed to providing reasonable and appropriate accommodations to students with disabilities and temporary impairments. If you have a disability or acquire a condition during the semester where you need assistance, please contact the Disability and Assistive Technology Center on the 6<sup>th</sup> floor of Albertson Hall (library) as soon as possible. DATC can be reached at 715-346-3365 or [DATC@uwsp.edu](mailto:DATC@uwsp.edu).

Bring your text, a calculator, and note-taking materials to every class. This is important because we will often times need calculators and books for group work. I will not supply "loaner" calculators--you must bring your own.

Please do not hesitate to raise your hand and ask questions during lecture if you are unclear on some point.

You are responsible for checking your e-mail and D2L daily.

You will be working with a lab partner, but any submitted work *must be your own*. Each student will submit his/her own unique lab report. **Copying is unacceptable. Any such assignments will not be accepted and will receive a score of zero points.**

Please turn all cell phones to vibrate before class. No texting or iPods allowed. Laptops are for taking notes only. If I see you texting or using your laptops in an inappropriate manner I will give you one warning before asking you to leave the class. *Talking/texting/surfing the web is inappropriate and will not be tolerated. It distracts other students and is rude.*

*You are responsible for working in the lab in a safe manner. This is for your safety, as well as the safety of others around you. If you are uncertain about anything in the laboratory, make sure to ask questions before attempting to perform the task in question.*

*Everyone in the laser lab is responsible for wearing laser goggles any time a laser is in operation.*

Treat all fellow students with respect and civility. Failure to do so will result in your dismissal from that day's lab.

**Academic Honesty/Plagiarism Policy:**

All work to be graded should be your own work, and not copied from any other person. Any instances of plagiarism or cheating will be dealt with in accordance with the UWSP Chapter 14 rules on Academic Misconduct. Any violations will result in a zero for that assignment/exam. A second violation results in an F for a final grade in the class.

**Accommodation of Persons with Disabilities:**

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 within the first two weeks of the semester. 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 on their website). You must have me sign the form and return it to the Office of Disability Services.

**University Policy on Absence to Observe Religious Holidays**

It is UW System policy to reasonably accommodate your sincerely held religious beliefs with respect to all exams and other academic requirements. You will be permitted to make up an exam or other academic requirement at another time or by an alternative method, without any prejudicial effect, if:

- There is a scheduling conflict between your sincerely held religious beliefs and taking the exam or meeting the academic requirements; and
- You have notified me within the first three weeks of the beginning of classes of the specific days or dates that you will request relief from an examination or academic requirement.
- I will accept the sincerity of your religious beliefs at face value and keep your request confidential.
- I will schedule a make-up exam or requirement before or after the regularly scheduled exam or requirement.
- You may file any complaints regarding compliance with this policy in the Equity and Affirmative Action Office.

**Tentative Course Outline**  
(Subject to change)

Week	Day	Date	Lab	Due
1	T	23-Jan	Checkin/Introductions	----
2	T	30-Jan	Lab 1/Lab2	----
3	T	6-Feb	Lab 2/Lab 1	----
4	T	13-Feb	Work Day	----
5	T	20-Feb	Introduction to Gaussian	----
6	T	27-Feb	Lab 3/Lab 4	Labs 1; Lab 2
7	T	6-Mar	Lab 4/ Lab 3	----
8	T	13-Mar	Work Day	----
9	T	20-Mar	Lab 5/Lab 6	Lab 3; Lab 4
10	T	27-Mar	<b>SPRING BREAK</b>	----
11	T	3-Apr	Lab 6/Lab 5	----
12	T	10-Apr	Work Day	----
13	T	17-Apr	Lab 7/Lab 8	Lab 5; Lab 6
14	T	24-Apr	Lab 8/Lab 7	----
15	T	1-May	Checkout	Formal report rough draft
16	T	8-May	Work Day	Lab 7-8
17	Th	17-May	----	Formal report

Please note, the last day to drop without a grade is Wed., Jan. 31, and the last day to drop with a "W" is Fri., April 6.

**Lists of Labs**  
(Subject to change)

Lab	Title	Shoemaker Lab	Supplementary Information
1	Emission spectrum of the hydrogen atom	----	See D2L
2	Absorption spectrum of a conjugated dye	Exp. 34	See D2L
3	An introduction to <i>ab initio</i> calculations	----	See D2L
4	Ro-vibrational spectra of HCl and DCl	Exp. 37	See D2L
5	IR spectra of simple chlorinated compounds	----	See D2L
6	Raman spectra of simple chlorinated compounds	Exp. 36	See D2L
7	Absorption spectrum of gaseous iodine	Exp. 40	See D2L
8	Emission spectrum of gaseous iodine	Exp. 40	See D2L