

Dr. Robert K. Wismer
Caputo214, Ext. 3661

Physical Chemistry II

Spring, 2009 22nov08version

Robert.Wismer@Millersville.edu

Office Hours: M–F 9:30-10:30, & by Appt.

TEXT: *Physical Chemistry*, 4th ed., Laidler, Meiser Sanctuary, Houghton-Mifflin, 2003.

A CALCULATOR that has log, ln, 10^x (antilog), and e^x functions.

LABORATORY NOTEPAD: 8.5 × 11", alternating white and carbonless copy pages.

LABORATORY SAFETY GOGGLES: Available in the bookstore. You **must** wear goggles whenever you are in laboratory, even if just visiting.

Tentative Course Schedule: Given on the attached course calendar. **Bold-face** numbers on the top line of each block are chapter numbers in LMS.

Problem Assignments: Daily problem assignments are due by the start of the lecture the next time class meets.

Problem sets are collected every day; late problem set solutions are not accepted. You may receive a copy of my solutions when you hand yours in (even when handed in late). Problem assignments are checked for an honest attempt on your part to work every problem. They are marked (not graded) on the following scale.

3 = All problems attempted; many correct.

2 = Most problems attempted; some correct.

1 = Few problems attempted; few correct.

X = No problem assignment handed in.

Restating a problem is not an honest attempt. Show some progress toward a solution. For every problem that you do not solve you must: restate the problem and explain exactly why you cannot solve the problem in addition to choosing another unassigned problem from the same material and solving it, *or* consult with the professor about that problem (as shown by the professor's initials on your homework page). At the end of the semester, your total problem set score will be scaled to a basis of 100 points. When letter grades are assigned at that time, your course total percentage will never be raised above your total problem set percentage. (Thus, if you earn 692 points total for the 1000-point course, but your problem set percentage is 65%, you cannot receive a grade of "C".) **Format:** on 8.5" × 11" paper with *no* ragged edges (please **remove** the little nibs); in pencil in the order assigned; neatly and legibly done; they can be on both sides of the paper. Concerning plagiarism, university policy is: if you submit another's work without giving credit, you fail the course. **First problem assignment LMS 7.10, 7.16, 7.19, 7.26, 7.27, 7.38** [2nd: LMS 7.4, 7.8, 7.18, 7.33, 7.39, 7.42]

Lecture Notes: Copies will be available the first day of class. Cost is \$5.00 for the lab manual and the lecture notes. Proceeds are used to purchase incidental laboratory and lecture supplies. You are expected to have read the appropriate pages of both the lecture notes and the text before coming to each day's lecture. We will discuss the material included in about seven pages of text each day of lecture. Some of the quantum mechanics comes from the notes only.

Tests: There will be eight 25-minute tests, closed book, closed notes, on the dates noted on the calendar. Each test is worth 50 points and is given at the beginning of the hour. The tests concentrate on the material covered in the problems, and also include other material discussed in class. Tests will emphasize answering questions and solving problems rather than derivations. However, you *will* be asked to derive some important expressions. You are responsible for **all** material covered to date in class; not just that since the previous test. You may bring one 3 × 5 card on **one side** of which you have written all you believe you need to know. This card is to be signed (by you) and turned in with your examination. No 3 × 5 card will be permitted for the final examination. You are responsible for all material covered in lecture, all material assigned in the text, all problems in any way similar to those assigned, and all material in the lecture notes.

Course Grading: In order to pass the course, you must perform all experiments, turn in all lab reports, and earn a lab grade of 60% (180 points) or more. You must also earn a test and final grade of 60% (360 points) or more.

Eight Tests (50 points each)	400 points	A	B	C	D
Laboratory (evenly divided among experiments)	300 points	90%	80%	70%	60%
Problem assignments	100 points	900	800	700	600 points
Final examination (covers CH 341 & CH 342)	200 points	"–" is	_0,	_1,	_2
TOTAL	1000 points	"+" is	_7,	_8,	_9

Academic Honesty: If you submit someone else's work as your own, you have committed plagiarism. Confer with the instructor if you have doubts. University penalties for academic dishonesty are severe: from an examination or paper grade of zero to expulsion from the University. Academic dishonesty penalties become part of your official record.

Cancelled Classes: "The cancellation of classes by the University does not alter the mutual responsibility of faculty and students to fulfill the requirements of the curriculum." [Faculty Senate 29 Oct 2001] In the event that classes are cancelled, we shall agree as a class on means to make sure that the content of the course is not compromised.

Absences: YOU ARE RESPONSIBLE for obtaining the notes for any class you miss, whether your absence is excused or not. You must arrange to make up any missed work. Absences may be excused for university-sponsored events, jury duty, military duty, death or critical illness in immediate family, or personal illness. Support each request for excuse with a written statement of the absence's reason, signed by the responsible person (coach, faculty member, judge, commander, physician), including that person's phone number. Except for death or illness, requests for excuse must be presented before the date of the anticipated absence. An excuse for personal illness is granted if a physician states you were too ill to come to class.

Laboratory: This semester, you (and your partner, of course) will perform the following **five** of these **six** experiments.

Conductance (of aqueous solutions)

Eutectic (determination of a binary system)

Dipole (μ determination in solution)

Solubility Product (potentiometrically)

Transport (number determination)

IR (interpretation of the spectrum of HCl or DCl)

You two will perform **three additional experiments.**

UVvis (interpretation of I₂ or Br₂ spectrum)

Kinetics (determination of order, k , and E_a)

One "original" experiment of your choosing.

"Your choice" must be approved by the instructor at least two weeks before you plan to start work on the experiment.

You do not have to perform the experiment of your choice at the end of the semester.

Before you arrive in laboratory during the first week of the semester, you will have chosen the experiment for which you will be responsible ("your experiment"), and turned in the prelaboratory report by noon of that day. That first week, you set up that experiment, make sure that all parts are working, and take one trial set of data. During the second week, you will collect data from your experiment and will begin the analysis of those data. The final report for "your experiment" is due on **2 February**. You **MUST** obtain literature-quality results to receive any credit for this report.

All students are expected to be present and working in laboratory each Tuesday afternoon from 1–4 p.m., the regular scheduled working time (or at your regularly-scheduled time). You may not work at other times unless you have been present. This is so that you can fulfill your obligation to assist your comrades in getting an experiment working.

On Friday of the first week of classes you and your partner turn in the order in which you prefer to perform the remaining experiments of the course. The schedule for the entire class will be returned to you the following class day. I assume that you have no objections to the publication of your e-mail address unless you tell me so.

All other aspects of laboratory work are as described in the laboratory manual. The due date of near-final draft is at 11:00 a.m. Monday; final draft the following Wednesday at 11:00 a.m.

ATTENTION! The class meets in Ganser Library (convene in the lobby) on Monday 26 January 2009 at 11:00 a.m. for an introduction by Science Librarian Ms. Megan O'Malley to computer access to the last 50 years of Chemical Abstracts, as well as other electronic resources. Of course, literature values for many systems were published prior to 1960.

Final reports are due at 11:00 a.m. on Wednesday. **FINAL VERSION OF EVERYTHING IS DUE AT NOON ON WEDNESDAY 29 APRIL 2009.** Please plan accordingly. Give suggestions regarding specific experiments to those "responsible" for that experiment so that they can write a report. It would be kind to give them that information by noon the previous Wednesday. Weeks 6, and 9 are **CatchUp/WorkAhead** weeks, explained in the lab manual. Feel free to work as far ahead as possible. Just be sure you have the permission of the pair that has the system reserved for that week.

Prelabs are due by 11:00 a.m. the day (Monday) **before** you work in lab; if the prelab is late, you may not work in lab the next day. A prelab also "reserves" the system for you. So that you learn more of the chemical literature, both *Handbook of Chemistry and Physics* and *International Critical Tables* are unacceptable references; reports citing them will be returned. Don't forget to turn in your data pages on the day you work in laboratory.

As stated often in class, reports must compare error (result vs. literature value) with deviation (variation among repeated measurements of the same quantity) and experimental uncertainty. Near final drafts that omit this comparison will be returned unmarked. It is not acceptable to substitute experimental uncertainty (propagation of uncertainties in making measurements) for deviation.

Physical Chemistry II— — Spring Semester 2009

Laboratory information is written in the Tuesday block of each week

23 nov 2009 Version

12 7 ElecSolns	13 1 Set-Up	14 7 ElecSolns	15	16 8 EchemCell
19 NO CLASSES 20	2 Set-Up	21 8 EchemCell	22	23 8 EchemCell
26 9 BasicKinet TEST1	27 3 Set-Up	28 9 BasicKinet	29	30 9 BasicKinet
2 9 BasicKinet RPTSETUP	3 4 2nd Expt	4 10 ComposMech	5	6 10 ComposMech TEST2
9 10 ComposMech NFV2ND	10 5 3rd Expt	11 11 AtomicStruc RPT2ND	12	13 11 AtomicStruc
16 11 AtomicStruc NFV3RD	17 6 WorkAhead TEST3	18 11 AtomicStruc RPT3RD	19	20 11 AtomicStruc
23 11 AtomicStruc	24 7 4th Expt	25 12 ChemBond	26	27 12 ChemBond
2 SPRING	3 BREAK	4 SPRING	5 BREAK	6 SPRING
9 12 ChemBond NFV4TH	10 8 5th Expt	11 12 ChemBond TEST4 RPT4TH	12	13 12 ChemBond
16 12 ChemBond NFV5TH	17 9 WorkAhead	18 13 ChemSpec RPT5TH	19 TEST5	20 13 ChemSpec
23 13 ChemSpec	24 10 6th Expt	25 13 ChemSpec	26	27 13 ChemSpec
30 13 ChemSpec NFV6TH	31 11 7th Expt	1 13 ChemSpec RPT6TH TEST6	2	3 13 ChemSpec
6 14 ModAppSp NFV7TH	7 12 8th Expt	8 14 ModAppSp	9	10 14 ModAppSp RPT7TH TEST7
13 14 ModAppSp	14 13 8th Expt	15 14 ModAppSp	16	17 14 ModAppSp
20 15 SolidState	21 14 FinishUp	22 15 SolidState TEST8 NFV8TH	23	24 15 SolidState RPT8TH
27	28	29	30	1

FINAL 8:00 am on Thursday 30 April 2009

What follows is an example of how laboratory experiments will be reported to you on a weekly (at least) basis. The reserved system for each experiment is written on the second line of each block. You need to plan far enough in advance so that you can order any needed chemicals, if need be, for your system. The maximum time that you can reserve a system is four (calendar) weeks ahead. Please realize that experimenters early in the semester will “use up” systems that are stocked in the laboratory, making it much more likely that those who perform the same experiment late in the semester will have to place an order for chemicals. For that reason, you may reserve a system as far ahead as you like if that system must be ordered. Inadequate preparation or lack of prior planning will not be accepted as a reason to repeat another’s group’s system, even though I am sympathetic to your situation.

Experiment and Apparatus Reservation Sheet

21Jan05 Version

Week	Conductivity	Dipole	Eutectic		IR	Ksp	Transport		UVvis	Kinetics	Original
1-2	Beacham Phillips HAc <i>Ka</i>	Chatterjee Ruby CHCl ₃ /Br ₃	Kirui Waldo Naph. Cl ₂		Dionne Tabora HCl	Martin Weinberger AgSCN					
3										DT	
4	CR	KW	BP		MW	DT					
5	KW	BP	DT			CR				MW	
6				WORK AHEAD				CATCH UP			
7	MW					BP	CR		DT	KW	
8	DT	MW			CR				KW	BP	
9				WORK AHEAD				CATCH UP			
10			MW			KW			BP	CR DT	
11		DT			KW				CR		BP MW
12-13					BP				MW		CR DT KW
14				FINISH UP				FINISH UP			