

# CHEMISTRY 152C, WINTER 2009

## SYLLABUS, POLICIES, AND PROCEDURES

Lectures: M, T, Th 4:30 PM, BAG 131

Course Web Site: <http://depts.washington.edu/chem/courses/>

**Prerequisites.** Completed CHEM 142 with a grade of 1.7 or greater.

**Add or Drop.** Go to Bagley 271 (stockroom) or Bagley 292 (undergraduate services)

### INSTRUCTORS

**Class:** Prof. Bo Zhang      BAG 303D  
email: zhang@chem.washington.edu  
Office hours: T @ 2:30 -3:30 p.m.  
                  Th @ 2:30 -3:30 p.m.  
                  Or by appointment (via email)

**Lab:** Dr. Andrea Carroll    CHB 204K  
Telephone: 616-5319  
email: ageddes@u.washington.edu  
Office hours: M 10:00-12:00

**Lead TA:** Wesley Hillman (hillmanw@u...)

### Teaching Assistants:

<u>Sections</u>	<u>Name (email)</u>
CA, CJ	Kevin Johnson (kevinj2@u.washington.edu)
CB, CK	Thomas Schneider (tschneid@u...)
CC, CH	Wesley Hillman (hillmanw@u...) Lead TA
CD, CL	Max Zeigler (mzeigler@u...)
CE, CF	Curtis Deer (cjd22@u...)
CG, CI	Luke Marney (marneylc@u...)

### MATERIALS

**Except where indicated, all are available from the University Bookstore**

Zumdahl, *Chemical Principles*, Sixth Edition, Houghton Mifflin (required).

Kelter, *Study Guide, Chemical Principles*, Sixth Edition (optional).

*Chemistry 152 General Chemistry Laboratory Manual* (required).

Laboratory notebook with numbered pages and carbonless copies (required). You may continue to use a notebook from a previous quarter if it meets the stated criteria.

Scientific calculator (graphing calculator is NOT required), goggles, lab coat and WebAssign access card. WebAssign access can also be purchased online at

<http://www.webassign.net>.

## COURSE DESCRIPTION

### The course consists of:

- 3 lectures a week (see exact schedule later in the syllabus)
- 1 quiz section a week
- 1 three-hour laboratory session most weeks of the quarter (6 labs total).

Attendance at **all** course components is essential to obtain a satisfactory grade in this course.

## COURSE OBJECTIVES

### The central ideas presented in this course are:

**Thermodynamics.** We will begin the course by exploring the concepts of energy, enthalpy, entropy, and the Gibbs energy. The ultimate goal of this section of the course is to develop the tools that allow one to predict if a chemical reaction will be spontaneous.

**Electrochemistry.** We will revisit "redox" chemistry previously described in CHEM 142, and use this reaction class as an opportunity to explore the thermodynamic concepts described above.

**Quantum Mechanics and Atomic Theory.** In this portion of the course you will be introduced to the modern description of the hydrogen atom as derived from quantum mechanical principles. This description will be extended to other atoms, and eventually used to construct the periodic table of the elements.

**Bonding.** Chemical bonds are "where the action is" in Chemistry. We will develop a description of chemical bonds (covalent, polar covalent, and ionic) and explore some simple models capable of predicting bonding patterns (Lewis dot structures) and molecular shapes (VSEPR).

In the **lab** portion of the course you will conduct laboratory exercises that:

- Emphasize and apply the concepts learned in lectures.
- Develop laboratory, data analysis, and scientific writing skills.

## ACADEMIC ETHICS

**Original work performed in good faith is assumed on all laboratories/exams/worksheets.**

It is presumed that the data you record and report in laboratory is your work. University rules (<http://www.washington.edu/students/handbook/conduct.html>) define scientific and scholarly misconduct to include the following forms of inappropriate activities:

- Intentional misrepresentation of credentials
- Falsification of data
- Plagiarism

Failure to adhere to this code of ethics will result in prosecution to the fullest extent. In short, if you have not done something yourself, do not attempt to pass it off as original work.

## GRADING

The point distribution for the evaluative components of the course is as follows:

2 midterm exams (50 min. each, 100 pts. each)	200
Quizzes (lowest quiz score dropped)	80
Homework (lowest HW score dropped)	80
Laboratory	140
<u>Final exam (1 hr. 50 min.)</u>	<u>200</u>
TOTAL	700

**Grade Distribution.** The undergraduate curriculum committee has established that the final mean GPA in Chemistry 152 should fall within the range 2.6 +/- 0.2. It is the Chemistry Department's policy not to make grade changes of 0.1 after final class grades are submitted to Records.

**Late Policy.** No extensions are given for WebAssign assignments. For lab report policies, refer to the front pages of the lab manual.

## LECTURES

**An approximate schedule assigns chapters to be covered each week is on page 9.** You are responsible for material covered in class AND in the textbook. Attendance at lectures is expected.

Out of respect for your classmates, please observe the following rules:

- Arrive on time. If an emergency causes you to arrive late, please enter quietly through the rear doors of the lecture hall.
- Do not pack up your belongings before the end of lecture.
- Keep conversation to a minimum.
- Turn off your cell phone or pager.

## LABS

The lab consists of a pre-lab exercise, lab work, and post-lab report. The lab schedule is given on page 10

**Attendance. You must attend every laboratory session.** If you miss more than one lab without an excused absence, you will fail the class. The same policies described about missing an exam apply here. If you do miss lab, please contact your TA (if possible in advance of the lab) and the stockroom (Bagley 271). We will try to schedule you into an alternate lab time. See Dr Harvey, Bagley 294, if you need to be excused (there is no alternate time, or you need to be assigned a make-up lab). See the laboratory manual for more details.

**Safety.** There is an element of hazard in any laboratory course. You are required to follow the safety instructions as outlined in your laboratory manual. In particular, you are required to wear approved safety goggles and a lab coat during all the experiments. If you do not dress appropriately, you will not be allowed to attend the lab session. No open-toed shoes, bare legs or ankles will be permitted, nor will any clothing that interferes with lab activity.

**Pre-labs.** The information necessary to prepare yourself for each lab is available via the 152 Lab link on <http://depts.washington.edu/chem/courses/>. This course uses internet-based pre-labs. You will both receive and submit your assignments online via the internet. For more details, see the WebAssign description under homework. *Check the due dates for the pre-labs to avoid being shut out.* You must score at least 3.5 points (out of 5 total) on the WebAssign pre-lab before the due date, which is set to coincide with the first scheduled lab period of the week. If you don't have the required 3.5 point score by the due date, you will have 15 points deducted from your grade for the lab report. The purpose and procedure sections of your notebook must be completed before your lab period.

**Lab Notebook.** Bound laboratory notebook with numbered pages (not loose leaf) **and carbonless duplicate copies** are available at the bookstore. *Please note the special nature of this lab notebook:*

All recording and reporting must be in this notebook in ink. Line through your errors neatly instead of erasing or whiting out.

On the first page of your notebook write (i) your name and student number, (ii) Winter Quarter 2009, (iii) the course number, Chem. 152C.

Start the experiments on page 2.

Write your name, section, and experiment number on each page you use.

***Be prepared to hand in the duplicate pages at the end of each lab period.***

**During Labs.** Perform only assigned work. If any deviations are necessary, consult your TA first. Record observations (data), perform all necessary calculations, and based on your results, come to some conclusion.

**Before You Leave the Lab.** Your TA will check and make sure that you have done all assigned work He/She will initial your lab notebook and ask for a duplicate copy of your work.

**Post-Lab Reports.** Unless instructed otherwise, all post-lab reports are due at the beginning of your next laboratory session. The report templates are available via the 152 Lab link on <http://depts.washington.edu/chem/courses/>.

Exp. #1: Safety Exercise & Weak Acid Titration, *Excel Template Submission (5 pts pre-lab + 60 pts notebook & Excel template)* Report due at the beginning of the next Lab session.

Exp. #2: Calibration Curves and an Application of Beer's Law, *Excel Template Submission (5 pts pre-lab + 60 pts notebook & Excel template)* Report due at the beginning of the next Lab session.

Exp. #3: Thermodynamics I, *Excel Template Submission (5 pts pre-lab + 60 pts notebook & Excel template)* Report due at the beginning of the next Lab session.

Exp. #4: Thermodynamics II, *Excel Template Submission (5 pts pre-lab + 60 pts notebook & Excel template)* Report due at the beginning of the next Lab session.

Exp. #5: Electrochemistry, *Excel Template Submission (5 pts pre-lab + 60 pts notebook & Excel template)* Report due at the beginning of the next Lab session.

Exp. #6: Atomic Emission Spectroscopy, *Excel Template Submission (5 pts pre-lab + 60 pts notebook & Excel template)* Report is due the following week in your quiz section.

## QUIZ SECTIONS

Part of the quiz section is devoted to a quiz on the material covered the previous week. The remainder of the quiz section is devoted to helping you with difficulties in understanding the lecture and lab materials.

## HOMEWORK

**This course uses internet-based homework exclusively.** You will both receive and submit your assignments online via the internet. Assignments will be available at least one week before they are due. You are responsible for determining the due date and time for all homework. In addition, internet-based services generally do not employ an atomic clock to determine the time; therefore do not wait until the last second to turn in your work! The internet homework interface is called "WebAssign" and can be found at <http://www.webassign.net/washington/login.html>.

## How to access WebAssign:

Go to [www.webassign.net/washington/login.html](http://www.webassign.net/washington/login.html)

Click on the button labeled "Log In" which takes you to the UW NetID weblogin page:

The diagram shows two input fields on the left. The top field is labeled "UW NetID:" in red text. An arrow points from this field to a larger box on the right containing the text "Your UW Net ID (e-mail address without the '@u.washington.edu')". The bottom field is labeled "Password:" in red text. An arrow points from this field to a smaller box on the right containing the text "Your UW Net ID password".

Click on the "Log In" button which takes you back to WebAssign.

## Notes:

Each student must purchase an access code to use WebAssign.

Access codes can be purchased either in person at the UW bookstore, or online at WebAssign's website. Enter the code in the assignment titled "WebAssign Registration". There is a 2-week grace period before access codes are enforced.

Click on the "Student Guide" for information about how to use WebAssign. Also, the "Intro to WebAssign" assignment will help you learn how to use WebAssign.

If you need additional help, see your TA or go to the Chem Study Center (BAG 330).

## HELP RESOURCES

**Instructor:** See instructor office hours on the front page

**Teaching Assistant:** Your teaching assistant (TA) will advise you his/her office hours during the first week of the quarter. Your TA is an important person to your success.

**Chemistry Study Center, Bagley 330:** The study center is open M to Th from 9:00 am to 6:00 pm and 9:00 am to 2:00 pm on F. The study center is staffed with experienced teaching assistants.

**Undergraduate Services, Bagley 292/294:** The staff can help with scheduling problems, clicker or WebAssign problems, or issues that arise during the course.

## EXAMS

**There are 2 midterm exams and a final. The dates for these exams are provided in the list of lectures on page 9 of the syllabus.** Chemistry knowledge is cumulative so questions on exams will often depend on knowledge from earlier chapters.

## Exam Protocol

Bring your calculator and a photo ID to all exams.

You must sit according to the *seating charts*, posted on the walls in the front of the classroom a few days before the exam.

One hour exams will be graded and returned in quiz section.

Keys to exams will be posted on the Chem 152C class web site.

## Re-grading (applies to Exams and to Lab Reports)

If it is a simple addition error, show the exam/report to your TA for correction.

**Regrade must be for  $\geq 5$  pts!** To have your exam/report re-graded, it must be given to your TA **within 48 hours of its return to you** along with a note explaining what you want regraded.

We reserve the right to re-grade the entire exam/report, so you may lose rather than gain points. Note that we will be Xeroxing a subset of the exams, and will compare your exam to the Xerox of the original. Any discrepancies will be treated as academic misconduct (see above).

## Absences

If you are absent from a midterm examination through sickness or other valid unavoidable cause, the weight of your final exam will be increased proportionately in calculating the course grade.

**Examples of unavoidable causes include:** illness, death or serious illness in the immediate family, and, provided previous notification is given, observance of regularly scheduled religious obligations and attendance at academic conferences or field trips, or participation in university-sponsored activities such as debating contests or athletic competition. **Absence due to participation in university-sponsored activities such as debating contests or athletics require prior approval (please do this during the first week of the course).** Bring a letter from your coach or organizer with your schedule for the quarter to Dr. Tracy Harvey in Bagley 294.

**If you have an unanticipated absence from an exam,** following the following procedure:

Report your absence from an hourly examination within 72 hours to Dr. Tracy Harvey in Bagley 294.

Bring proof of your unavoidable cause (a doctor's note, an accident report, a memorial folder, or similar documentation). The documentation must include a contact name and telephone number.

Dr. Harvey will notify the instructor of the status of your absence. If your absence does not meet the above criteria, you will be given a zero for the exam.

If you are absent from the final examination, and you are ineligible for an incomplete according to UW regulations, then you will receive a course grade of 0.0. If an incomplete is given, you must take the final exam for the same course in the next regular academic quarter in which it is offered to remove the incomplete. You must be passing the course through the 8<sup>th</sup> week of instruction in order to be eligible for an incomplete. No exceptions to this rule will be given.

## **KEYS TO SUCCESS**

Attend ALL classes, pay close attention and take notes.

Chemistry is sequential and hierarchical. You must learn and digest today's lecture before you can expect to understand tomorrow's lecture. Study at least two hours for each hour of lecture. Spend one hour for every hour of lab. Find a place that allows for periods of uninterrupted study. Skim through chapter or sections to be covered in the next lecture.

Make daily, weekly and quarterly plans and follow plan.

Practice what you are to do on the exams. Work many problems.

Talk chemistry with fellow Chem. 152 students. The study center (Bagley 330) is a good meeting place.

## List of Lectures

<b>Week</b>	<b>Lecture Topic</b>
<b>1</b> 1/5	Introduction to Course / Thermodynamics Lec 0 / Lec 1 / Lec 2 (Chap 9) (Quiz, no quiz) (HW 1 due Friday Midnight)
<b>2</b> 1/12	Thermodynamics Lec 3 / Lec 4 / Lec 5 (Chap 9) (Quiz 1) (HW 2 due Friday Midnight)
<b>3</b> 1/19	Thermodynamics <b>Holiday</b> / Lec 6 / Lec 7 (Chap 10) (Quiz 2) (HW 3 due Friday Midnight)
<b>4</b> 1/26	Thermodynamics Lec 8 / Lec 9 / Lec 10 (Chap 10) (Quiz: Review for Midterm 1) (HW 4 due Friday Midnight)
<b>5</b> 2/2	Electrochemistry <b>Midterm 1</b> / Lec 11 / Lec 12 (Chap 11) (QZ: Disc Midterm 1)
<b>6</b> 2/9	Electrochemistry Lec 13/ Lec 14 / Lec 15 (Chap 11) (Quiz 3) (HW 5 due Friday Midnight)
<b>7</b> 2/16	Intro to Quantum Mechanics <b>Holiday</b> /Lec 16 / Lec 17 (Chap 12) (Quiz 4) (HW 6 due Friday Midnight)
<b>8</b> 2/23	Quantum Mechanics Lec 18 / Lec 19/ Lec 20 (Chap 12) (QZ: Review for Midterm 2) (HW 7 due Friday Midnight)
<b>9</b> 3/2	Bonding <b>Midterm 2</b> / Lec 21 / Lec 22 (Chap 13) (QZ: Disc Midterm 2) (HW 8 due Friday Midnight)
<b>10</b> 3/9	Bonding Lec 23 / Lec 24 / Final Review (Chap 13) (Quiz 5) (HW 9 due Friday Midnight)
<b>11</b> 3/16	<b>FINAL</b> FRIDAY, MARCH 20, 2009, 4:30 - 6:30 PM, BAG 131

If you would like to request academic accommodations due to a disability, please contact Disabled Student Services, 448 Schmitz, 543-8924 (V/TDD). If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present the letter to me so we can discuss the accommodations you might need for this class.

## LABORATORY SCHEDULE

WEEK	#	M	T	W	Th	F
1/5	1					
1/12	2	Lab #1 Weak Acid Titration	Lab #1	Lab #1	Lab #1	Lab #1
1/19	3	Holiday				
1/26	4	Lab #2 – Calibration Curves	Lab #2	Lab #2	Lab #2	Lab #2
2/2	5	Lab #3 – Thermodynamics I	Lab #3	Lab #3	Lab #3	Lab #3
2/9	6	Lab #4 – Thermodynamics II	Lab #4	Lab #4	Lab #4	Lab #4
2/16	7	Holiday				
2/23	8	Lab #5 – Electrochemistry	Lab #5	Lab #5	Lab #5	Lab #5
3/2	9	Lab #6 – Atomic Emission	Lab #6	Lab #6	Lab #6	Lab #6
3/9	10					
3/16	11	FINALS	FINALS	FINALS	FINALS	FINALS

## DISCUSSION AND LAB SECTIONS

Note: The rooms and times for the lab and quiz sections are listed in the table below. The rooms are subject to last-minute changes by the university during the first few days of the quarter. On the day of your first attendance to these sections, please check your schedule on MyUW to verify the room assignment.

Section	Day			Time	Location	Teaching Assistant
CA	QZ	W		1130-1220	SWS B012	Kevin Johnson kevinj2@u.washington.edu
	LB		TH	1130-220	BAG 236	
CB	QZ	W		1230-120	MGH 228	Thomas Schneider tschneid@u.washington.edu
	LB		TH	1130-220	BAG 236	
CC	QZ	W		130-220	PAR 213	Wesley Hillman - Lead hillmanw@u.washington.edu
	LB		TH	1130-220	BAG 236	
CD	QZ	W		130-220	MUE 153	Max Zeigler mziegler@u.washington.edu
	LB	W		330-620	BAG 233	
CE	QZ	W		230-320	DEN 310	Curtis Deer cjd22@u.washington.edu
	LB	W		330-620	BAG 233	
CF	QZ	W		1030-1120	LAW 116	Curtis Deer cjd22@u.washington.edu
	LB		TH	630-920	BAG 233	
CG	QZ	W		1130-1220	PAR 106	Marney Luke marneylc@u.washington.edu
	LB		TH	630-920	BAG 233	
CH	QZ	W		930-1020	BLD 392	Wesley Hillman - Lead hillmanw@u.washington.edu
	LB		F	1130-220	BAG 233	
CI	QZ	W		1030-1120	PAA A212	Marney Luke marneylc@u.washington.edu
	LB		F	1130-220	BAG 233	
CJ	QZ	W		1230-120	PAR 313	Kevin Johnson kevinj2@u.washington.edu
	LB		F	1230-320	BAG 236	
CK	QZ	W		130-220	BNS 115	Thomas Schneider tschneid@u.washington.edu
	LB		F	1230-320	BAG 236	
CL	QZ	W		230-320	CHL 105	Max Zeigler mziegler@u.washington.edu
	LB		F	1230-320	BAG 236	

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