CHEM 4581 and CHEM 4591 Syllabus, Fall 2009

Lab Coordinator
Bill Eberle
Ekeley M240
303-492-8973
eberle@colorado.edu

Professor of Record
Rex Skodje
Ekeley W145C
303-492-8194
rex.skodje@colorado.edu

Course Homepage
http://www.colorado.edu/chemistry/chem4581_91/

Pre-requisites/Co-requisites
For CHEM 4581 – CHEM 4411 or CHEM 4511
For CHEM 4591 – CHEM 4431 or CHEM 4531 & CHEM4581

Office Hours
TA's will be available for questions during their lab section or by appointment.

Tues 9-12 Rob Hill (Robert.Hill@colorado.edu)
Tues 1-4 Yu-Ju Lu (yu-ju.lu@colorado.edu)
Wed 2-5 Rob Hill (Robert.Hill@colorado.edu)
Thurs 1-4 Yu-Ju Lu (yu-ju.lu@colorado.edu)

Course Requirements
CHEM 4581 – Five lab reports and the error analysis problem set
CHEM 4591 – Six lab reports

Course Goals
Physical chemistry laboratory should help promote understanding of concepts learned in corresponding classes including thermodynamics, kinetics, and spectroscopy. Emphasis will lie on an ability to take accurate data, analyze data and errors and connect the data to theory. The course will also help develop your ability to write clear, scientific papers.

Laboratory Technique/Participation/Preparation
You are expected to follow laboratory safety procedures, discussed on the first day of class. Most labs will be completed in groups of two. Each group member is expected to participate in data collection. The calculation and lab write up is expected to be an individual effort. You are expected to have read copies of the experiments before walking in to the laboratory. Some labs require preliminary calculations or decisions to be made concerning measurements that will need to be done. You should have an understanding of what you will be doing that day before you arrive to class. Your lab section TA will assign the points for lab technique, participation and preparation upon completion of each experiment and may ask questions about the experiment at any time during the lab section to gauge your preparedness.

Notebooks

Your notebook should be neatly organized and have a table of contents. All experiments should begin on a new page with the proper title. Data should be recorded in a neat fashion, including units and measures of error. Be sure to note makes and models of instruments used. If the instrument isn't commercially available, it may be beneficial to draw a picture of it. Your notebook should be more than just a collection of random numbers. Someone should be able to repeat the experiment just by looking at your notebook. Make sure your TA or the lab coordinator signs and dates your notebook before leaving. Carbon copies or photocopies of your notebook should be turned in with your lab report. There will be a separate notebook grade assigned by the grader of your lab report.

Reports

Your reports should include a title, abstract, introduction, data, calculation, results, discussion, conclusion and reference sections. Each of these sections should appear separately and labeled. These sections should be written clearly and concisely, with your reports averaging no more than 4-5 pages not including figures or tables. Please see the "how to write a lab report handout" for more details on writing your reports. Although you have collaborated with a partner while taking the data, the lab report is expected to be completely your own work. Lab reports are due one week after the time allotted to complete each experiment. (There are two weeks allotted for each experiment.) Each report will have the 100 possible points allotted differently. The points allotted to each lab section vary from experiment to experiment, and are available for your reference on the course website. Late reports will have 5 points per day deducted. Lab reports handed in more than a week late will not be accepted.

Grading

700 total points for 4581/ 720 total points for 4591 divided as follows:

Six lab reports (Error analysis counts equivalent to a lab for 4581)	600 pts
Notebook	10 pts per experiment
Lab Technique/Participation/Preparation	10 pts per experiment

This is a laboratory course; there will be no written examinations.

Conflicts

If you qualify for accommodations because of disability please submit a letter to Professor Skodje from disability services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities (303-492-8671, Willard 322, www.colorado.edu/disabilityservices)

We will make every effort to fairly accommodate students who have conflicts with scheduled labs, assignments or required attendance because of religious obligations. Please notify your TA, Bill Eberle, and Professor Skodje of anticipated conflicts by January 23rd, and please notify us of unanticipated conflicts (eg. funerals) as soon as possible. The full text of the Boulder campus policy can be read on the web at http://www.colorado.edu/policies/fac_relig.html

Honor Code

The university has adopted a student honor code, which can be found at the web site below. Students are expected to observe the honor code in all work for this course.
http://www.colorado.edu/academics/honorcode

List of Experiments

CHEM 4581

A. Thermodynamics
- Heats of Combustion and Heats of Formation
- Heat of Vaporization
- Dimer of Acetic Acid
- Binary Solid-Liquid Phase Diagram

B. Kinetics I
- Surface Adsorption
- Gas-Liquid Chromatography

CHEM 4591

C. Kinetics II
- Naphthalene Quenching
- Kinetics of a Fast Reaction

D. Spectroscopy
- X-Ray Diffraction
- Band Spectra
- Absorption Spectrum of Conjugated Dyes
- Vibrational-Rotational Spectrum of HCl
- Raman Spectroscopy

E. Others
- Electronics

PHYSICAL CHEMISTRY LABORATORY INFORMATION

CHECK BULLETIN BOARD AND BLACKBOARD at the beginning of each lab period for additional notes on the experiments, announcements, schedule changes, etc.

SCHEDULES

Lab schedules are prepared and posted by the lab coordinator at the beginning of the semester. Any changes must be approved by the lab coordinator in advance.

SAFETY

1. No Smoking. No food or drink in lab.
2. Chemical safety goggles are required. Safety glasses or shop goggles are not adequate.
3. Suitable clothing is required (long pants, closed shoes [no sandals]).
4. Keep work areas clear of extraneous books, coats, packs, etc.; use shelf and hooks by the door for these things. (Including ipods, cell phones, and other "distractive devices".)
5. Be familiar with location and use of chemical washes and fire extinguishers.
6. Be familiar with evacuation routes from the lab. A diagram is posted on the bulletin board.

EQUIPMENT

There are no individual sets of equipment. Each experiment has its own set of equipment. When you are finished for the day, please do the following:

1. Clean all glassware and other equipment.
2. Cap all chemical containers.
3. Clean, zero, and close all balances; clean up balance area.
4. Electrical and electronic equipment: leave it as you found it. If it was on, leave it on; off, then off; unplugged, then unplugged.
5. Clean up work areas and dispose of used chemicals in appropriate containers.
6. There are drawers near the front of the lab labeled with section meeting times. You may leave goggles, sweat pants, etc. in the drawer designated for your section between lab meetings.

DISPOSAL OF USED CHEMICALS

Disposal containers are available in the lab. Do not dispose of used chemicals in the sinks unless specifically instructed to do so. Disposal containers are marked for each experiment and are normally found at the experiment work station. If you are unsure about what to do with used materials ask the TA or Lab Coordinator.

Do not put broken glass in the waste baskets, a separate container is provided. Report breakage to the TA or Lab Coordinator.