Columbia University

S1500X: General Chemistry Laboratory

Summer 2011

Instructors:

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The basis of our understanding of the chemical world comes from controlled experimentation and observations made in the laboratory. This course is designed to introduce you to common laboratory techniques and procedures used in the chemistry lab. This learning experience will focus on developing laboratory skills and strengthening your understanding of the concepts behind the experimental findings.

We will operate common lab instruments, such as the balance, spectrometer, and pH meter. We will perform experiments that demonstrate fundamental concepts in chemistry, such as kinetics, solubility, acid-base theory, and electrochemistry. In addition to familiarizing you with common lab practices, we hope to increase your comfort level and self-confidence in the lab.

Regardless of your purpose in taking this course, we hope you will encounter practical applications of chemistry to the non-laboratory world and that your chemical understanding will increase.

Course Objectives

This laboratory course introduces standard techniques basic to all chemistry laboratory work, such as weighing, filtering, and operating analytical instruments. You will also learn to accurately record scientific data and to derive results from it.

Course Organization

Each section of students is taught by a Teaching Assistant (TA) and supervised by an Associate in Chemistry (Associate).

You must be registered for **both** lab lecture (S1501X.003), as well as a lab section (S1500X).

All lab sections have a **required** Monday lecture (S1501X.003) that will be from 3:30PM-4:40PM in 309 Havemeyer Hall. Lab sections meet from 1:00PM-4:40PM to complete the experiments (Tuesday, Wednesday, Thursday, or Friday).

Course Materials

On the first day in the lab, you will be provided with goggles and a lab coat.

The required textbook for this course is Laboratory Manual for General Chemistry, John Wiley & Sons, Inc, 2010. This book is a Wiley Custom Manual derived from Beran, J.A. Laboratory Manual for Principles of General Chemistry, 8th Edition, John Wiley & Sons, Inc, 2009.
Either version of the manual is acceptable.

You need to buy a duplicate sheet laboratory notebook, which is required for experimentation. The Chandler Society will be selling notebooks during the first week of class, if you wish to buy a notebook through them. You must write a prelab for Experiment #1 in your notebook before attending the second laboratory session.

Information related to each experiment is available on Courseworks and should be consulted before writing up each experiment in your laboratory notebook.

It is advisable that you consult a General Chemistry textbook in addition to the manual. Following is a list of possible references that are on reserve in the Science and Engineering Library (Northwest Corner Building).

-Zumdahl, S. S. *Chemical Principles* (6th Edition). Houghton Mifflin Co, 2009.
-Oxtoby, D.W., Gillis, H.P., and Campion, A., *Principles of Modern Chemistry* (6th Edition). Brooks Cole, 2008

Grading of the Course

The average grade in this course over the past few years has been B+. Most students who have completed this course have received grades between B- and A.

Course Information

Calculator
The only calculator permitted for use on exams and quizzes is the TI-30XS MultiView. This is the policy of the Chemistry Department.

Proper Lab Attire
You are required to wear completely closed (toes, heels, tops and sides), non-absorbent shoes in the chemistry laboratory; completely closed tennis shoes are permissible. You must wear ankle length attire (no shorts, nylons, leggings, spandex, short skirts, Capri pants, etc.) that reaches your shoes, and remove contact lenses before entering the lab. Long hair should be pulled back and all jewelry removed.

Lab Locker
You will have access to a locker outside the lab only for the duration of your lab session. You may only store your belongings in the locker during your lab session since other lab sessions use the same lockers. You must bring a lock for this locker. We reserve the right to cut off any locks after your lab session has ended.

Late Work
A three-point deduction will be imposed for the first day a laboratory report is late. A half point will be deducted for each day thereafter (excluding weekends and holidays). ***The last day to turn in any work is the day of the final exam.***

Note: If a legitimate family or medical emergency prevents you from completing an assignment on time or if you cannot attend lab due to an acceptable excuse, email your Associate as soon as possible.

Makeup Policy
A legitimate excuse (medical/family emergency or religious holiday) grants you the right to make up the missed lab on another day of the week when the experiment is being performed (if space allows) or during the make-up session (see the course schedule). If you are absent from lab or know you will be absent please contact Sarah or Joseph as soon as possible.

Unexcused absences result in a 5-point penalty (i.e. the lab is worth a possible 25 points instead of 30 or 15 points instead of 20) when you make up the lab. Even if you have already missed the lab, you must speak to your Associate regarding the absence.

Recording the Course Lecture
All students who would like to record the class lecture must contact Sarah or Joseph to fill out a waiver form.

Office Hours (Schedule is available on Courseworks)
Teaching Assistants and Associates will hold weekly office hours in **Havemeyer 343** and the schedule will be posted online once the semester begins. You may ask any TA or Associate about the experimental write-ups, Post Laboratory Questions, Study Problems or Prelaboratory Assignments. All grading questions must be discussed with your assigned TA **as soon as possible** after the work is returned and before the next assignment is returned.

Calculation and conceptual questions must be addressed at office hours and not through email. *Email is reserved for notification of class absences, administrative issues and related items that lend themselves to electronic correspondence.*

General Chemistry Laboratory (S1500X)

Summer 2011 Course Schedule

DATES	ACTIVITIES / EXPERIMENTS	QUIZ	ASSIGNMENT DUE
Week One **5.23 – 5.27**	Course Intro/Check-in Dry Lab 1 and Technique Activity		
Week Two* **5.30 – 6.3**	Exp. 1: Basic Lab Operations (1) & Identification of an Unknown Compound (2)	None	Dry Lab 1 and Technique Activity
Week Three **6.6 – 6.10**	Exp. 2: Limiting Reactant (8)	Exp. 1†	Exp. 1 Report (Full)
Week Four **6.13 – 6.17**	Exp. 3: Vitamin C Analysis (30)	Exp. 2†	Exp. 2 Report (Partial)
Week Five **6.20 – 6.24**	Exp. 4: Acid/Base (9 and 18)	Exp. 3†	Exp. 3 Report (Full)
Week Six **6.27 – 7.1**	Exp. 5: Spectrophotometric Metal Ion Analysis (35) + Preparing a Vitamin Sample (from supplemental pdf)	Exp. 4†	Exp. 4 Report (Full)
Week Seven** **7.4 – 7.8**	Exp. 6: Transition Metal Complexes (36)	Exp. 5†	Exp. 5 Report (Full)
Week Eight **7.11 – 7.15**	Exp. 7: Galvanic Cells; Nernst Equation (32)	Exp. 6†	Exp. 6 Report (Partial)
	Midterm: Thursday, July 21, 2010 (8PM-9PM in 309 Havemeyer)		
Week Nine **7.18 – 7.22**	Exp. 8: Biological Chemistry	Exp. 7†	Exp. 7 Report (Partial)
Week Ten **7.25 – 7.29**	Exp. 9: Kinetics (24) & Catalyst (23)	Exp. 8†	Exp. 8 Report (Partial)
Week Eleven **8.1 – 8.5**	Exp. 10: Aspirin Synthesis and Analysis (19)	Exp. 9†	Exp. 9 Report (Partial)
Week Twelve **8.8 – 8.12**	Q/A Session for the Final, Check-out, and Make-up Labs (Exp. #7-10)	Exp. 10	Exp. 10 Report (Full)
	Final Exam: Friday, August 12, 2010 (9:30AM-11:30AM in 309 Havemeyer)		

***Due to the holiday on Monday, May 30th, the Experiment #1 lecture will be on Friday, May 27th at 2:30PM.**
**** Due to the holiday on July 4th, the Experiment #6 lecture will be on Friday, July 1st at 11:30AM.**

† Quizzes 1-9 may include questions from the prelab assignment for the experiment being carried out that week; although these prelab assignments are not graded, it is suggested you complete them.