Columbia University

S1500Q.002: General Chemistry Laboratory

Summer 2011 (July 6th – August 12th)

Instructor:

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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** the lab lecture (S1501Q.002), as well the lab section (S1500Q.002).

All lab sections have a **required** lecture Monday/Wednesday 1:00PM–2:00PM in 209 Havemeyer Hall. You need to attend the lecture for which you are registered. After the lecture experimentation will take place from 2:15PM–5:55PM.

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.

You need to buy a duplicate sheet laboratory notebook, which is required for experimentation. 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 Mathematics and Science Library (303 Mathematics).

-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 completed this course have received grades between B- and A.

Full Lab Reports: Exp. 1, 3, 5, & 8			**4 x 30 = 120**
	Pre-Lab Notebook Preparation	3	
	Safety, Technique & Knowledge of Procedure/Clean-up	5	
	Observations	2	
	Calculations/Graphs	10	
	Results & Discussion	10	
	Full Lab Report Total	**30**	
Partial Lab Report: Exp. 2, 4, 6, 7, 9, & 10			**6 x 20 = 120**
	Pre-Lab Notebook Preparation	3	
	Safety, Technique & Knowledge of Procedure/Clean-up	5	
	Observations	2	
	Calculations/Graphs/Results	10	
	Partial Lab Report Total	**20**	
8 Quizzes (10 points each)			**8 x 10 = 80**
Quiz Questions			**3 x 5 = 15**
Research Paper			**15**
Midterm (Experiments 1-6)			**30**
Final Exam (All Experiments)			**60**
Total			**440**

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 an assignment is late. An additional one 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, due to the nature of a six-week course it is critical you email Sarah as soon as you miss a lab session or know you will be absent.

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 Sarah regarding the absence.

Recording the Course Lecture
All students who would like to record the class lecture must contact Sarah 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**, 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, Prelaboratory Assignments or any course 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 Course Schedule (S1500Q)

Summer 2011

DATES	ACTIVITIES / EXPERIMENTS	QUIZ	ASSIGNMENT DUE
Wednesday, July 6th	Course Intro/Check-in; Dry Lab 1 and Technique Activity	None	None
Friday, July 8th	Exp. 1: Basic Lab Operations (1) & Identification of an Unknown Compound (2)	None	Dry Lab 1 and Technique Activity
Monday, July 11th	Exp. 2: Limiting Reactant (8)	Exp. 1*	Exp. 1 Report (Full) Exp. 2 Report (Partial)
Wednesday, July 13th	Exp. 3: Acid/Base (9 and 18)	Exp. 2*	Quiz #2 Questions
Monday, July 18th	Exp. 4: Vitamin C Analysis (30)	Exp. 3*	Exp. 3 Report (Full) Exp. 4 Report (Partial)
Wednesday, July 20th	Exp. 5: Spectrophotometric Metal Ion Analysis (35) + Preparing a Vitamin Sample *(from pdf on Courseworks)*	Exp. 4*	Quiz #4 Questions
Monday, July 25th	Exp. 6: Transition Metal Complexes (36)	Exp. 5*	Exp. 5 Report (Full) Exp. 6 Report (Partial) Topic for Research Paper
Wednesday, July 27th	Midterm Exam		
Monday, August 1st	Exp. 7: Galvanic Cells; Nernst Equation (32)		Research Paper Due Exp. 7 Report (Partial)
Wednesday, August 3rd	Exp. 8: Aspirin Synthesis and Analysis (19)	Exp. 7*	Quiz #7 Questions
Monday, August 8th	Exp. 9: Kinetics (24) & Catalyst (23)	Exp. 8*	Exp. 8 Report (Full) Exp. 9 Report (Partial)
Wednesday, August 10th	Exp. 10: Biological Chemistry	Exp. 9*	Exp. 10 Report (Partial)
Friday, August 12th	Final Exam		

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