Pima Community College
West Campus

CHM 151IN Laboratory Schedule and Supplement
Spring 2012

Course Information:

Course Prefix/Number: **CHM 151IN Lab**

Course Title**: General Chemistry I Laboratory**

Semester**: Spring 2012**

CRN (Section Code): _____

Class Days/Times: _____

Site/Room: **Sci K-221**

Instructor Information:

Name: _____

Office: _____

US Mail: **Pima Community College – West Campus**
2202 W. Anklam Rd.
Tucson, AZ 85709-0270

Phone/Voice Mail: _____

E-mail: _____

Availability: **Office hours**: _____

Laboratory Manual: Selegue, Thomas and David A. Katz, Editors, **General Chemistry in Action**, 2nd Edition, Hayden McNeil, 2011 (Note: This laboratory manual is designed for 2 semesters, CHM 151 and 152.)

Online Homework and Laboratory Program: Mastering Chemistry (program is included with textbook)

Laboratory Notebook: You are required to have a laboratory notebook. Options for a laboratory notebook are:
A bound laboratory notebook with duplicate pages – available at the Pima C.C. bookstore.
A composition book with sewn-in pages - available at most area stores
Check with your laboratory instructor as to the type of notebook required for this class.

CHM 151IN Laboratory Schedule for Spring 2012

Week of	Days	Experiment
Jan 17-20	Tues-Fri	Meet classes, distribute lab schedules. No experiment
Jan 23 – 27	Mon-Fri	Safety Lecture (NOTE: Safety test is given online. See information under laboratory safety.) Check-in Review of lab policies, proper lab techniques, and use of laboratory balances. How to write chemical formulas and equations using Word How to construct data tables using Word or Excel How to construct graphs using Excel
Jan 30 –Feb3	Mon-Fri	Extraction and Analysis of Plant Dyes: (Lab manual, page 1) Extraction and Filtration of the Dye and Analysis of the Dye Using Thin-layer Chromatography Analysis of the Dye Using Absorption Spectrophotometry Analysis of the Dye by Observation of Acid-base Properties
Feb 6 – 10	Mon-Fri	Determination of an Empirical Formula (Lab manual, page 7)
Feb 13 – 17	Mon-Fri	Precipitation Reactions and Pigments: (Lab manual, page 11) Precipitation Reactions Making a Pigment
Feb 20 – 24	Mon-Fri	Rodeo Week – No experiment
Feb 27 – Mar 2	Mon-Fri	Determination of Copper in an Alloy (Lab manual, page 45) Exploring the Copper Cycle Determination of Copper Using Wet Chemical Methods
Mar 5 – 9	Mon-Fri	Recycling a Metal into a Chemical Compound: The Preparation of Alum (Lab Manual, page 21)
Mar 12 – 16	Mon-Fri	Spring Break – No experiment
Mar 19 – 23	Mon-Fri	Determination of Ascorbic Acid in a Vitamin C Tablet (Lab Manual, page 27) Standardization of the Base and Determination of Ascorbic Acid by Acid-base Titration Determination of Ascorbic Acid by Redox Titration
Mar 26 – 30	Mon-Fri	Determination of Iron in a Multivitamin Tablet (Lab manual, page 51)
Apr 2 – Apr 6	Mon-Fri	Measurement of the Heat Capacity of a Metal (Lab manual, page 59) one metal only. Three trials AND Measurement of Enthalpies of Reaction (Lab manual, page 63) Measuring the Molar Heat of Neutralization only. Three trials.. ***Note: Choice Lab proposal due this week***
Apr 9 – 13	Mon-Fri	Heat of Combustion of Magnesium (Lab Manual, page 69)
Apr 16 – 20	Mon-Fri	Choice Lab
Apr 23 – 27	Mon-Fri	Choice Lab – continue project or work on presentation
Apr 30 - May 4	Mon-Fri	Choice Lab Presentations Final Lab Checkout

Choice Labs for Spring 2012

Choice labs are a FINAL LABORATORY PROJECT for the semester. Choice lab projects are extensions of experiments that were performed during the semester.

Your group or team will select one of the following topics to investigate and write a proposal for the experiment that must be submitted to your instructor no later than **April 6, 2012.**

The laboratory staff needs approximately one week to prepare materials for the choice labs. You will not be able to obtain the chemicals and apparatus needed on the same day you submit your proposal.

Each of the choice lab projects must be selected by one group or team before a second group can choose the same project.

The proposal must include:

a. An abstract of the experimental design
b. An initial procedure
c. The type of data that will be collected
d. The apparatus and chemicals that will be required. Please include approximate quantities.

Other than the materials in your lab drawer, your group will only be given the materials listed in your proposal. Please be advised that the chemistry department only stocks standard solutions of common acids and bases along with those solutions that were used in the laboratory experiments during the semester. If you need other reagent solutions, you will need to prepare and standardize them yourself.

Choice lab presentations:

a. Consists of a poster or PowerPoint and oral presentation to share with the class
b. Contains a written report of the investigation
c. Have contributions from each member of the group.

You must complete all parts of the choice lab to get credit for the project.

The Choice Lab Projects are:

Project 1:

You have solutions of 5 chemical compounds, identify them.
The unknowns come from the following list:

H_2SO_4	HCl	HNO_3	NH_3	NaOH
$AlCl_3$	$AgNO_3$	$BaCl_2$	$CuSO_4$	$FeCl_3$
KI	$Pb(NO_3)_2$	NaCl	Na_2CO_3	Na_3PO_4

You will not receive any additional chemicals. You may request litmus paper, pH paper or an indicator.

Project 2:

Two bottles of chemicals are found on a shelf in a rarely used storeroom. The labels on the bottles have disintegrated due to age. The shelf is labeled "iron compounds" . An inventory shows that the following iron compounds were stored on that shelf:

$Fe_2(SO_4)_3 \cdot 7H_2O$

$FeCl_3 \cdot 6H_2O$

$Fe(NO_3)_3 \cdot 9H_20$

$Fe(NH_4)(SO_4)_2 \cdot 12\ H_2O$

a. Determine the percent of iron in each of the compounds
b. Identify the unknown compounds

Project 3:

Determine the amount of sodium hypochlorite and the available chlorine in a sample of commercial bleach.

Project 4:

Determine the amount of solar heat storage for 1.0 kg of granite assuming a ΔT of 40°C. During the day, the temperature of a sun porch stabilizes at 90°F. After sunset, the external temperature drops to 60°F resulting in cooling of the sun porch. How much granite would be required to maintain the temperature of a 15 x15 x 10 ft sun room at 75°C for a minimum of 5 hours once the temperature drops 60°F?

Laboratory Policies

This is an integrated class, which means that your laboratory grade is part of your final course grade. You must pass both the lecture portion and the laboratory portion to pass the course.

You are expected to read each experiment and check the safety precautions for all chemicals used in the experiments before coming to class. A pre-lab assignment will be required. Your laboratory instructor will provide more information on these requirements.

If you are not prepared for lab, you may be asked to leave and will receive a grade of zero for that laboratory experiment.

Laboratory reports follow the format outlined by your lab instructor. (A suggested laboratory report format is given later in this syllabus.) Data analysis calculations, graphs, and questions must be completed for each laboratory report.

Reports are due no later than **one week** after the experiment is completed.

Laboratory reports are graded based on neatness, completion of introductory information, completion and presentation of data, sample calculations, summary of results and conclusions, and answers to data analysis questions.

Laboratory reports may be graded on a 10 point, 25 point,100 point, or other point scale, by your laboratory instructor.

Missed or incomplete experiment reports may be graded as a zero.

Choice labs and the presentation count as a double experiment.

Questions based on the laboratory experiments and calculations may appear on exams and quizzes in the lecture portion of this course. You are responsible to know how each laboratory experiment works (theory and general procedure) and how to do the calculations.

LABORATORY SAFETY

Laboratory safety is a major component of working in a chemical laboratory. At the beginning of the semester, you are given a safety lecture in the laboratory. The safety information is also printed in the General Chemistry in Action laboratory manual.

The laboratory safety test is administered online through the Mastering Chemistry program. The safety test consists of 35 questions and will be timed for 45 minutes. You must obtain a score of 100% in order to pass the safety test. You will have 3 chances to pass the safety test with a grade of 100% in the week between the safety lecture and up to 48 hours before your first laboratory experiment. If you do not pass the safety test, you will not be permitted to work in the laboratory and will receive a grade of zero for the first experiment. You will have another 3 chances to pass the safety test in the following week.

You must abide by the safety rules during the semester. This includes wearing safety goggles when working with chemicals, wearing closed shoes, not sandals or flip-flops, appropriate dress, and following proper methods of chemical disposal. Non-compliance may result in you being asked to leave the laboratory with a grade of zero for that day.

PRE-LABORATORY ASSIGNMENTS/OR QUIZZES

You are required to complete pre-laboratory assignments or pass pre-laboratory quizzes. Your laboratory instructor will explain his/her policy for pre-laboratory assignments. Pre-laboratory quizzes will be administered online through the Mastering Chemistry program.

Pre-laboratory quizzes will consist of questions about the purpose and/or the background of the experiment, laboratory safety as it relates to the experiment, the procedure, and calculations necessary for the experiment.

You must pass the pre-laboratory quizzes at least 48 hours before your scheduled laboratory class in order to be permitted to work in the laboratory.

THE LABORATORY NOTEBOOK

INTRODUCTION

Chemistry is an experimental science. As such, much of the progress of chemistry depends on the communication of scientific data and experimental results between researchers. It is important, therefore, that a course in chemistry should teach how to accurately record scientific data and experimental results through the use of the laboratory notebook and laboratory reports.

THE LABORATORY NOTEBOOK

The laboratory notebook is meant to be a permanent record of the experimental data and observations that one measures or observes during experiments. During the laboratory period all data and observations are to be recorded

DIRECTLY into the laboratory notebook and **NOT** on separate sheets of paper nor the data pages of the experiment or laboratory manual.

The laboratory notebook is meant to be used as a **WORKBOOK**, it is functional, not pretty. It will contain both satisfactory and unsatisfactory results, errors and corrections, calculations, graphs, and other information from the laboratory experiments. Since all entries are made in the laboratory, it is expected that the information be orderly, legible, and clearly labeled, sufficient so that the information is comprehensible to someone with training comparable to your own. The notebook will not be graded on its appearance, it will be graded mainly on its content.

The laboratory notebook must be a **BOUND** book with sewn-in pages and a cover, such as a "Composition Book" or equivalent. Spiral, loose-leaf, and perfect binding (pasted-in pages) notebooks are **NOT ACCEPTABLE**. Quadrille pages are preferred, but lined pages are acceptable. **The suggested guidelines for keeping the laboratory notebook are given in Appendix G of the General Chemistry in Action laboratory manual.** (**NOTE:** Your laboratory instructor may request that the information you record in your laboratory notebook differs from this format to fit the requirements for your particular laboratory course.)

LABORATORY REPORTS

CHM 151 is a science and engineering major class. You are expected to be able to write an organized laboratory report.

A laboratory report is the means by which a researcher or research team communicates the result of an experiment or series of experiments to his/her colleagues. It is a summary of the important information which a researcher recorded in his/her laboratory notebook with detailed explanations of the results. Such reports are often communicated as research papers at scientific meetings or are published in scientific journals.

The laboratory report is the means by which your instructor can determine your comprehension of the scientific principles involved in an experiment as well as to evaluate your ability to make careful measurements and observations, to calculate numerical results, and to organize your experimental data.

A single laboratory report is required for each experiment. If an experiment is divided into two parts, the laboratory report is for the entire experiment.

ONE WEEK after you have completed each experiment, a laboratory report must be handed in to your instructor. **The report should be printed on 8½ x 11 inch paper** and stapled together with a single staple in the upper left-hand corner. **All graphs (when required) must be drawn on graph paper and clearly labeled or, preferably, constructed using a program such as Excel.** The report must be written in the third person (do not use: I, me, my, we, our, etc.) and should **follow the suggested guidelines given in Appendix H of the General Chemistry in Action laboratory manual.** (**NOTE:** Your laboratory instructor may request that your reports differ from this format to fit the requirements for your particular laboratory course.)

Your laboratory instructor may require individual laboratory reports or a single team report. If the laboratory report is a team effort, all members of the team should contribute to the report.

If your laboratory reports are individual reports, members of the same team will have identical data, but the laboratory reports are should not be identical.

The laboratory report is part of your laboratory experiment. The experiment is **not** considered to be complete until the laboratory report has been received.

Not having the data from the experiment because your lab partner did not give it to you is not an excuse for not completing a laboratory report.

LATE LABORATORY REPORTS will be down-graded based on the number of days the report is late. Reports that are more than one class late will be graded on a pass/fail basis only (pass = "D"). Reports more than two classes late may not be accepted, at your instructor's discretion, and you may be assigned a grade of "zero" for that experiment. (If you are absent on the day a laboratory report is due, email the report to your instructor or take the report directly to your instructor on the day you return to school or leave it in his/her mailbox in the department office building.)

INCOMPLETE LABORATORY REPORTS will be graded “as is” with points deducted for missing sections.