I. Safety

**Eye Protection.** You are required to bring your safety equipment to every laboratory session, including safety glasses that can be worn over prescription glasses, and a lab coat or lab apron. Some procedures such as Nochromix lab will require the use of safety goggles; bring them with you when necessary. Approved eye protection (available at the UCI Bookstore) must be worn in the laboratory at all times. Contact lenses may not be used because volatile chemicals that get into the eye may become trapped under a lens. When entering the lab for the first time, look for the location of the nearest eyewash, and keep its location in mind throughout the quarter. If contamination of the eyes occurs, promptly find the nearest eyewash and rinse the affected areas continuously for at least 15 minutes.

**Protective Clothing and Footwear.** Closed-toe shoes and a laboratory coat or apron are required in the laboratory. An apron worn on top of the lab coat is recommended for labs involving concentrated acids and/or bases. No open-toe shoes, slippers, high-heeled shoes, shorts, short skirts or open belly/back/shoulder shirts are allowed in the lab. **Arms and legs must be fully covered with clothing.** For example, if you attempt to wear an apron on top of an open shoulder blouse or a lab coat over shorts, you will be asked to leave the lab and go change. Points will be taken off for being late as a consequence. Baggy clothing with large flaps is also not allowed (because you may accidentally knock down glass containers when moving your arms). Our recommendations are: jeans, long-sleeved shirt, socks, and fully closed shoes.

**Safety Equipment.** The eyewash and safety shower are located outside RH491. Become aware of the location of the safety shower so that you can find it quickly if an emergency requiring full body rinsing arises. The lab is equipped with a first aid kit, fire extinguisher and fire blanket. Learn their locations, and follow the instructions of your laboratory TA concerning their use. Vinyl gloves are available in the lab. You must wear them for handling any irritating or dangerous substances. However, gloves must be removed prior to touching common objects around the lab such as computer keyboards, doorknobs, pens, etc. Treat any spill on the skin as serious and rinse the area extensively with water for at least 15 minutes. You must report chemical spills and other safety issues to your laboratory TA. Be prepared to remove any contaminated clothing, which may be holding noxious materials in contact with your skin and use the emergency shower if necessary. Your safety is more important than your modesty in such instances.

**Laboratory Conduct.** Eating and drinking in the lab is strictly forbidden: please try to have a good nutritious meal before you come to the lab. You are welcome to store food inside your backpacks. Using cell phones, listening to music, and using headphones are not permitted in the lab for safety reasons. Do not make a mess in your work area and in common work areas (such as balance stations). It is not only unsafe and inconsiderate; it may cost you points for your work. You will be required to clean everything up in your work area when you finish your work. If the TA finds the common lab areas to be very dirty/messy after everyone has left the lab, he/she may chose to deduct points from the entire class.

**Fume Hoods.** Chemicals/procedures that may release fumes must be handled/carried out in a fume hood. Fume hood lights should be turned on before use. Verify that the fume hood is functioning properly before starting a procedure. A good test is to hold a thin strip of paper next to the fume hood and see whether the air is flowing inside.

**Spills.** Spills of any kind (even water) must be cleaned up immediately so that other people are not threatened in any way. Acid spills must be neutralized immediately with base, and tested with litmus paper to ensure neutrality, before being wiped clean. Equipment, especially balances, must be protected from spills, by using procedures that avoid equipment exposure. Never make up solutions near equipment or transfer chemicals over equipment. Never set container on equipment while being wiped clean. Equipment, especially balances, must be protected from spills, by using procedures that avoid equipment exposure. Never make up solutions near equipment or transfer chemicals over equipment. Never set container on equipment while being wiped clean.

**Disposal of Used Materials:** No chemicals or solutions are to be disposed of by pouring them down the drains. Disposal of certain neutralized acids constitutes an exception; your TA will instruct you concerning the proper disposal methods for each experiment. Be sure to dispose of each item in the proper container. Do not generate more disposable material than necessary. Processing of the containers is very expensive.

**Chemical Hazards:** Treat every chemical as though it is hazardous until you are thoroughly familiar with its properties. Consult your TA or MSDS (material safety data sheet) references, available in the stockroom if you are not absolutely sure of the nature and degree of possible hazards. MSDS documents are available for all chemicals used in these labs. Double check the label on any container from which you withdraw chemicals to verify that you are taking what you think you are taking. Never return chemicals to their storage containers. Think carefully about how much you need, and take only that much.

II. Fatigue and Sickness

**Fatigue.** Have a good night’s rest before the lab. Your TA will ask you to leave the lab if you show significant signs of fatigue, exhaustion, or sickness.
Infectious Diseases (Flue, Angina, etc.). Students with symptoms of infectious diseases may not come to the lab under any circumstances (if you do you will be sent back home). You must inform your lab TA about your absence by e-mail or telephone. You will get a chance to catch up with your lab work on a different day during week 10. If you have to miss more than two weeks due to sickness contact the course instructor.

III. Lab report preparation

You are required to write your own report for every project, regardless of whether the project involved group or individual work. All lab reports must be typed in a word-processing application such as Microsoft Word. The text should be single-spaced; margins should be set to 1”; font size should be 11-12 points; a common font such as Times New Roman is strongly recommended. If you use Word 2007 do not save your files in new “docx” format; not all TAs may be able to read them. Use the Word 1997-2003 file “doc” format instead. Figures and drawings must be embedded in your document as images; not as application objects. For example, if you generate a graph in Excel you should copy and paste it into your document using “Paste Special → Image” command. You may want to convert your document into PDF format if you want to preserve formatting exactly the way you had it. Please adhere to the following report format (a sample report is available on-line).

1. **Title page**: The first page should include the title of the project, your name, the date, your UCI ID number, names of your group members (for group projects), your TA's name, your lab section, and the code of your unknown.

2. **Abstract**: Start your report with a short (3-4 sentences) paragraph that explains the procedure and summarizes the main result of your measurement with estimated uncertainties.

3. **Introduction**: This part should be between 1-2 paragraphs long. Describe the general and specific goals of your project.

4. **Experimental Section**: The experimental section should be about 1-2 pages long. For the individual projects, provide a brief description of the procedure in your own words (do not rewrite the procedure). For group projects, describe the underlying principles for operation of the instrument being used. Include schematic diagrams of the instrument. Use appropriate references. For example if you use an image from an online source in your report, refer to this online source. If there were significant deviations from the standard procedure, describe them in detail and justify them.

5. **Results**: This section should have a typical length of 2-3 pages. Include the most significant data you obtained in the form of graphs and tables. All graphs and tables must have captions (see sample report). The graph axes and table columns/rows must be appropriately labeled; units must be included in the labels.

6. **Discussion**: This section should have a typical length of 1-3 pages. This is where you analyze the data in order to extract the desired concentrations and their associated uncertainties. The steps you took to analyze the data, including a detailed analysis of uncertainties, and the significance of the data should be included.

7. **Summary**: In one paragraph, critically evaluate the strengths and shortcomings of the procedure; suggest ways of improving it. Do not repeat the abstract.

8. **References**: List all the information sources you used in preparation of this report. For journal articles, list the authors, title, journal name, volume, year, and pages. For books, list the title, authors, year, and publisher. For online sources, cite the web-link. Index all references in the order of appearance.

IV. Lab report submission (this section was modified on October 3, 2009)

- All lab reports must be submitted on-line using EEE DropBoxes. A separate DropBox will be set up for every report, SX_LabY_name, where X indicates your particular section number, Y indicates the lab number.
- Give your file a short informative name such as “lab2.doc”. Do not worry about including your name and ID number in the file name; the DropBox will automatically take care of that for you during the file upload.
- Upload your file to the AssignmentSubmission section of your DropBox BEFORE the deadline.
- Upload only ONE file per report. You may not upload different parts of your report separately in multiple files. Do not e-mail your reports to TAs; use DropBoxes only.
- In some cases, TAs may request a printed copy of your report for grading. Even if this is the case you are still required to submit an electronic copy of your report to the DropBox.
- Your graded lab report will be returned to the AssignmentReturn section of your DropBox. Some lab TAs may choose to print your lab and return their notes to you on paper, especially if there are a lot of corrections.
V. Lab report grading

Each lab report is worth 100 points. For most lab reports, the points are allocated as follows. Deviations from this scheme, if any, will be discussed in the individual project descriptions.

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prelab (must be submitted at the beginning of the lab section)</td>
<td>5*</td>
</tr>
<tr>
<td>Duplicate copies of lab notebook (must be submitted at the end of the lab section)</td>
<td>5**</td>
</tr>
<tr>
<td>Title page</td>
<td>2</td>
</tr>
<tr>
<td>Abstract</td>
<td>3</td>
</tr>
<tr>
<td>Introduction</td>
<td>10</td>
</tr>
<tr>
<td>Experimental section</td>
<td>10</td>
</tr>
<tr>
<td>Results section</td>
<td>30</td>
</tr>
<tr>
<td>Discussion section</td>
<td>30</td>
</tr>
<tr>
<td>Summary section</td>
<td>3</td>
</tr>
<tr>
<td>Reference section</td>
<td>2</td>
</tr>
<tr>
<td>Total:</td>
<td>100</td>
</tr>
</tbody>
</table>

* You will not be able to start the lab and miss all the points if the prelab is not submitted
** You will lose ALL points for the lab if these pages are not submitted or if they contain little meaningful data

The main purpose of the prelab is to ensure that students come to the lab prepared. Students should print the prelab pages from the course website, answer the prelab questions, and turn in the prelab to their TA at the beginning of the lab section. Students will not be able to start their labs until their prelab is submitted and checked by the TA. To ensure uniformity in grading, all Chem 151L TAs have been instructed to grade your prelabs on all or nothing principle. In order to earn points for a specific part of the prelab, everything must be correct including assumptions, solution, answers, units, and significant digits in your answers.

Duplicate pages of the lab notebook must be submitted at the end of each lab. The lab will count for nothing (zero points!) if these pages are not submitted, or they do not appear to contain much meaningful data. Write down any and all observations you may have during the lab.

The introduction section will be graded based on your ability to write in proper English and state the ideas clearly. In the instrumentation projects, a meaningful description of the measurement technique and the instrument will be required. The experimental section will be graded based on the clarity of the description of your experimental steps. The largest number of points is assigned to the Results and Discussion sections of your report. The TA will pay special attention to the correctness of your measurement and correctness of the uncertainty analysis. Check your calculations very thoroughly; a simple mistake in calculations will lead to incorrect results and cost you a lot of points. Very obvious errors in the results, such as negative percent mass, signify carelessness in the preparation of the report and will incur more serious deductions in points. Be sure to include enough graphs and calculations to support your conclusions. The following grading strategy will be applied to copies of your lab notebook pages and to every section of your lab report:

1. The report section is well-written; there are no mistakes in the calculations; all information requested is included: your score for this section will likely be in the range of 75-100%.
2. There are some omissions (for example no error analysis is included in the results section); answers are outside the expected measurement uncertainties; the topic is not discussed in sufficient detail: your score for this section will likely be in the range of 25-75%.
3. There are major omissions; answers are way off-base; the section is written in exceptionally bad English: your score is for this section will likely be below 25%.

The TA will deduct points for stylistic, grammatical, and spelling mistakes in your writing. Therefore, pay attention to your writing as well. Your TA will be at liberty to award up to bonus 10 points for especially well-written reports. Your TA will also be at liberty to remove quite a few points from your report in the following cases:
VI. Special situations affecting grading

Report submission deadlines. The following deadlines will apply to the report submission. Note that the EEE dropbox deadline feature will automatically prevent submission of any reports after the specified deadline.

- For the afternoon labs sections: The report must be in the EEE dropbox by 1:00 pm 7 days after you did this particular lab. For example, if you did the lab on Tuesday afternoon, the report must be submitted before 1 pm on next Tuesday.
- For the morning labs sections: The report must be in the EEE dropbox by 11:30 pm 6 days after you did this particular lab. For example, if you did the lab on Tuesday morning, the report must be submitted before 11:30 pm on next Monday. This is done specifically to prevent the students from working on their reports all night before the next lab section.

Late submissions. Reports submitted after this deadline will lose points as shown below.

a) After the deadline but less than 24 hours late: 10% off the final score
b) 24 hours – 48 hours late: 20% off the final score
c) 48 hours – 7 days late: 30% off the final score
d) 7 days – 14 days late: 50% off the final score
e) Labs 1-4 will not be accepted after 11 pm on Friday, November 6 (no exceptions)
f) Labs 5-8 will not be accepted after 11 pm on Monday, December 7 (no exceptions)

Redo requests. The TA may request that a revised report is submitted if it scores below 60 points on the first attempt. The revised report must be submitted within 7 days from the time of the TA’s redo request. The TA will take 20% off the final score obtained on the revised report (therefore, it pays to do a good job during the initial submission). If the revised report is submitted late, additional points will be deducted as shown above. Restrictions (e) and (f) apply to the revised reports. The higher number of points earned by the students in the original and revised reports will become the final score.

Example 1: A student gets 53 points after the initial attempt and asked to revise the report. The revised report is submitted in 10 days, and his new report is valued at 87 points. After removing 20% for the revision and 30% for not meeting the 7 day deadline, the report gets 87*0.8*0.7 = 48.7 points. The score remains at 53 points in this case.

Example 2: The same student, who got 53 points after the initial attempt, is asked to revise the report. The revised report is submitted in 6 days (on time). The report now gets 87*0.8 = 69.6 points. The student score is 69.6 points in this case.

Sickness delays. Students who miss their lab due to an infectious disease (see above) will have to do a make up lab during week 10. Restriction (f) will be extended by up to one additional week for such students.

Safety violations. TAs will be at liberty to deduct points for safety violations

<table>
<thead>
<tr>
<th>Category</th>
<th>Points removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student is late for lab by more than 15 minutes</td>
<td>10 points per each 15 minutes of tardiness</td>
</tr>
<tr>
<td>Minor safety violations (e.g., systematically forgetting to put protective gloves on; taking protective goggles off frequently; systematically setting beakers too close to the edge of the lab bench; exiting the lab while wearing protective gloves)</td>
<td>up to 20</td>
</tr>
<tr>
<td>Poor work practice (significantly cluttered work bench area; improper handling of chemicals leading to their contamination; improper handling of lab equipment leading to potential damage; improperly disposing of chemicals; etc.)</td>
<td>up to 50</td>
</tr>
<tr>
<td>Major safety violations (e.g., refusal to adhere to the safety guidelines described above; horseplay in the lab; deliberately breaking glassware or spilling chemicals; etc.)</td>
<td>100 along with possible expulsion from the course</td>
</tr>
</tbody>
</table>

Re-grading requests. Re-grading requests will be honored only in the events of book keeping errors (for example, when points were added incorrectly). You lab TAs will handle all such requests themselves.

Added on October 3, 2009: Refer to the “Grades” section on the course website for important information about the final letter grades for this course.