2008F Chem151L Laboratory Policies and Procedures

I. Safety

**Eye Protection.** You are required to bring your safety equipment to every laboratory session, including safety goggles that can be worn over prescription glasses, and a lab coat or lab apron. 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.

**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. Baggy clothing with large flaps is not a possibility either (because you may accidentally knock down glass containers when moving your arms). Our recommendations are: jeans, long-sleeved shirt, socks, and fully closed shoes.

Vinyl gloves are available in the lab for handling any irritating or dangerous substances. Wear them. Treat any spill on the skin as serious and rinse the area extensively with water for at least 15 minutes. Become aware of the location of the safety shower so that you can find it quickly if an emergency requiring full body rinsing arises. Be prepared to remove any contaminated clothing which may be holding noxious materials in contact with your skin. 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. It is not only unsafe; 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.

**Safety Equipment.** In addition to the eyewash and safety shower, 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.

**Fume Hoods.** Chemicals and/or procedures that may release fumes must be handled/carried out in a fume hood. 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. 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 with liquids or solids on top of instruments.

**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 reference sheets 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. Lab report preparation

There are nine projects in this course. The quarter starts with five individual projects. You do all the lab work and write the reports entirely by yourself. The quarter ends with four group projects. Your lab section TA is responsible for splitting you into groups. You work on these projects in groups of four people. Even though you share experimental work responsibilities with other people, you are required to keep your own laboratory journal and write your own report.

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; we will not be able to read them. Use the Word 1997-2003 file 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, your UCI ID number, names of your co-authors, your TA’s name, your lab section, and the code of your unknown.
2. **Abstract:** Start your report with a paragraph that explains the procedure and summarizes the main results with estimated uncertainties.
3. **Introduction:** Describe the goals of your project. This part should be 1-2 paragraphs long.
4. **Experimental Section:** The experimental section should be 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 (with appropriate outside references). For example if you use an image from an on-line 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. For all projects, provide a table of all the chemicals used (manufacturer, grade, and purity).
5. **Results and Discussion:** This should be the longest section of your report, with a typical length of 2-5 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. The steps you took to analyze the data, including a detailed analysis of uncertainties, should be included.
6. **Conclusion:** Summarize your findings in one paragraph. Do not repeat the abstract. Instead, critically evaluate the strengths and shortcomings of the procedure; suggest ways of improving it.
7. **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 on-line sources, cite the web-link. Index all references in the order of appearance.

III. Lab report submission

- All lab reports must be submitted on-line using EEE DropBoxes. A separate DropBox has already been set up for every lab section “151L Section X.” The “X” indicates your particular section 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.
- Upload your file to the AssignmentSubmission section of your DropBox **BEFORE** the deadline. The DropBox will automatically attach your UCI net ID to the file name.
- Upload only ONE file per report. **You may not upload different parts of your report separately.** Do not e-mail your reports to TAs; use DropBoxes only.
- 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. In some cases, TAs may also request a printed copy of your report.
IV. 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>10</td>
</tr>
<tr>
<td>Duplicate copies of lab notebook (must be submitted at the end of the lab section)</td>
<td>10*</td>
</tr>
<tr>
<td>Title page</td>
<td>2</td>
</tr>
<tr>
<td>Abstract</td>
<td>3</td>
</tr>
<tr>
<td>Introduction</td>
<td>5</td>
</tr>
<tr>
<td>Experimental section</td>
<td>15</td>
</tr>
<tr>
<td>Results and discussion section</td>
<td>50</td>
</tr>
<tr>
<td>Conclusion section</td>
<td>3</td>
</tr>
<tr>
<td>Reference section</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>100</strong></td>
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</table>

* The lab will count for nothing if these pages are not submitted or if they contain no 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 lab until their prelab is submitted. 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.

The largest number of points is assigned to the “Results and Discussion” section 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. Be sure to include enough graphs and calculations to support your conclusions. 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:

<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 (example: being 30 minutes late results in a loss of 15 points)</td>
<td>15 minutes late in excess of 15 min up to 20</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; 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; improperly disposing of chemicals; etc.)</td>
<td>up to 100</td>
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</table>

Regarding 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.

All reports must be submitted before the start of the next lab (generally, in one week). Reports submitted after the deadline will lose points as shown below. Exceptions to these rules will be considered only when a really compelling reason is provided, such as an accident or serious illness. All such exceptions must be supported by appropriate documentation and approved by the instructor (Prof. Nizkorodov).

- After the deadline but less than 24 hours late: 25% off the final score
- 24 hours – 7 days late: 50% off the final score
- More than 7 days late: 75% off the final score
- After the 10th week or never: 100% off the final score
The following information was added on October 1, 2008 (during the first week of instruction)

To ensure uniformity in grading, Chem 151L TAs have been instructed to grade your prelabs on the 0%-50%-100% principle:

1. Everything is correct including assumptions, solution, answers, units, and significant digits in your answers: your score will be 100%.
2. The assumptions and solution are correct, and your answer would have been right were it not for small mistakes, like a typo in one of the calculations, incorrect number of significant digits or missed units: your score will be 50%.
3. The assumptions are incorrect and/or your solution is way off base: your score will be 0%.

For example, each problem in prelab 1 is worth 2 points. Some of you will make incorrect assumptions in question 1 and get 2 points (100%) deducted. Some of you will not get everything right in question 5 and will likely lose 1 point (50%) as a result.

A similar 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%.

For example, if there are images in your report taken from on-line sources but you do not have a reference section at the end, you lose 2 points (100% off for the reference section).