

# Chemistry 100 TPSL Laboratory Course Syllabus

## Fall 2006

### **Overall Goal of CHEM 100L:**

The primary objective of this course is to provide the students with a set of tools, derived from theoretical and experimental exercises that will enable them to successfully conduct a water quality analysis of a local stream. In the process, the Oxford students will use these tools to teach local middle school students about the basic scientific principles involved in this study and supervise the younger students in the actual experimental procedure.

Specific areas of chemistry that will need to be mastered by the student during the course of this water quality assessment:

- concentration and solubility of ions in aqueous solution
- solubility of gases in aqueous solution
- acid/base chemistry and the importance of pH in aqueous solutions
- analytical methods of chemistry, e.g. titrations, that are important for completing water quality studies

### **General Laboratory Goals:**

- To develop analytical, critical thinking, and problem solving skills using chemistry specific approaches, methods, and techniques you are learning in lecture and lab.
- To strengthen your skills in communicating analytical results in a clear and concise manner.
- To think about, understand, and evaluate matter on both a macroscopic and a microscopic scale.
- To develop an understanding and appreciation of the scientific method.
- To develop an understanding of how a chemist approaches and solves problems.

At the end of the Chemistry 100 laboratory course students should be able to think like a chemist to solve a small range of chemistry problems using the scientific method. This includes making observations, developing predictive hypotheses, and designing appropriate experiments. The students should be able to perform these experiments using some of the major techniques of chemistry and construct tables and graphs to appropriately analyze and effectively represent their data. Finally, students should be able to interpret and communicate their results orally and in written form.

## **Grading Methods and Laboratory Course Requirements:**

- 15 % Pre-lab quizzes
- 30 % Lab report sheets
- 45 % Written Reports (and presentations)
- 10 % Instructor evaluation

\*You must pass both the lecture and the laboratory component to pass Chemistry 100.

### **Pre-Lab Quizzes**

You must come to lab prepared. To prepare for lab you must read the assignment and any background information or required reading - BEFORE LAB!!! The lab is student centered which means YOU, the students, are responsible for understanding the background information and performing each experiment. If you do not do the required reading before lab, this is impossible. Lack of preparation creates confusion and frustration. To help you avoid this, a pre-lab quiz will be given at the beginning of each lab. If you are late and miss the quiz, you will receive a zero for the quiz and may not be allowed to participate in lab.

### **Written Reports and Report Sheets**

A report in the form of a memo will be required for the assignments (3 of the 10 lab sessions). These reports should be written using a word processor. Do NOT wait until right before lab to write and print these reports since they constitute the majority of your laboratory grade. Write them as soon as possible after the laboratory session so that you can allow yourself time for reflection and revision. Make an outline of the important points that you must cover in explaining what you did and what the results were; then use as much creativity as possible! You will be required to revise these memos; both grades (the first graded memo and the revision) will count toward your lab average.

Make sure to print out the lab reports the night before your report is due. Do not wait until just before lab to print your report; you would be surprised by how many printers fail to operate just before lab begins! If you do not hand in your work at the beginning of the lab session it will be considered one day late. Late reports lose one letter grade per day.

You will be required to hand in a report sheet for labs that do not require a formal written report. The format for the report sheets and formal written reports is described below.

Report sheets should include:

- carbon copies of your lab notebook sheets (these should list the title of the experiment, a concise summary of your protocol, all observations, and a summary of the data collected)
- a separate sheet showing all necessary calculations
- any necessary tables or graphs
- answers to any questions posed in the laboratory handout

Formal summaries should include (in a word-processed document):

- a title page listing your name, course number, instructor, date, and title of experiment
- introduction (what did you do? why did you do it? why is it important?)
- experimental (briefly describe what was done to complete the laboratory study; use enough detail so that another skilled scientist could duplicate your work)
- data/results (use tables and/or graphs to document your data and results)
- discussion (provide a brief discussion of what conclusions you can make based on your data: what kind of confidence do you have in your data? what questions did your work answer? did the experiment help complete the objective stated in the introduction? what limitations/errors were present in the data collection and how could these be corrected in future experiments?)
- conclusion (succinctly re-state what you did, why you did it, and what type of questions you were able to answer using the experimental data; also briefly mention potential future work that may help to further answer/achieve the questions/objectives of the experiment)
- appendix of calculations (show at least one example of each type of calculation required by the experiment)

Note:

- all text should be double-spaced with 12 point font
- when writing a scientific report, it is generally accepted that the use of first person narrative should be minimized (e.g., instead of writing, “We found the temperature of the water to be 26°C,” you should write, “The temperature of the water was found to be 26°C.”)

## **Instructor Evaluation**

Because this is a student-centered laboratory, your attitude and performance can affect the other students. During the course of the semester the lab instructor will evaluate you in the following areas: attitude, being prepared, being on time, following the safety rules, working efficiently, finishing on time, and leaving the lab clean. The evaluation score will range from 0-100 points. Most students can expect to earn a score of 85. Exceptionally courteous, well-prepared, and efficient students can expect higher evaluation scores. Rude, quarrelsome, and unprepared students can expect lower scores.

## **Honor Code Policy:**

During a lab session students are encouraged to discuss the experiment with others to promote understanding and exchange ideas. If you discuss notebook write-ups, questions, and calculations with other students during lab, put the answers in your own words. **Lab reports (memos) and report sheets (including calculations) are expected to be your own work!!!** Collaboration on lab reports is a violation of the Honor Code and will be reported to the Honor Council. It is also a violation of the Honor Code to copy any portion of a report from a previous semester's report. To protect yourself from this situation do not work together on lab reports - do your own work! If you need assistance, ask your lab

instructor. If you are found to have violated the Honor Code you may receive a grade of F for both the lab and lecture portion of CHEM 100.

## Chemistry 100 Laboratory

### HONOR CODE STATEMENT

The Oxford College Honor Code applies to Chemistry 100 laboratories. You should be familiar with the stipulations of the Honor Code. Some areas in which it applies in this laboratory include, but are not limited to:

1. Lab reports (memos and report sheets) should be considered as tests. On a lab report you may not give or receive help from anyone but an Oxford College chemistry faculty member.
2. On a lab report (memos and report sheets), you may use your book, your notes, and the lab manual, but you may not look at or use any portion of another student's lab report. This applies to the report of any student currently in the course as well as to the report of any student who has taken the course earlier.
3. A paper submitted as a lab report (memos and report sheets) must be your work and your work alone. You may not use a portion of the paper of another current or former student, or a model paper by an instructor. This means you may not reprint a portion of another paper, photocopy a portion of another paper, retype a portion of another paper, or in any way incorporate a portion of another paper, including data, tables, and figures, into your paper. In addition, you may not have anyone else type your paper. However, you may have someone who is not currently enrolled in Chem 100 proof-read your paper for its writing (but not for its content). The Honor Code provisions regarding plagiarism apply to the lab report.

You should be aware that as the instructor, I am obligated to report any suspected Honor Code violations to the Honor Council for investigation. You should be aware that, if you are found guilty of violating the Honor Code by the Honor Council, the usual penalty is an F in the course.

I have read the Honor Code of Oxford College and the above statements as to how the Honor Code applies for this laboratory. I understand them and I agree to abide by them.

Name \_\_\_\_\_  
(signature)

Date \_\_\_\_\_

\_\_\_\_\_  
(print name)

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3. A paper submitted as a lab report (memos and report sheets) must be your work and your work alone. You may not use a portion of the paper of another current or former student, or a model paper by an instructor. This means you may not reprint a portion of another paper, photocopy a portion of another paper, retype a portion of another paper, or in any way incorporate a portion of another paper, including data, tables, and figures, into your paper. In addition, you may not have anyone else type your paper. However, you may have someone who is not currently enrolled in Chem 100 proof-read your paper for its writing (but not for its content). The Honor Code provisions regarding plagiarism apply to the lab report.

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