

## SYLLABUS

Chemistry 321 - Quantitative Analysis Laboratory

Fall 2010 – Dr. Atkinson, SB2-306, [AtkinsonD@pdx.edu](mailto:AtkinsonD@pdx.edu)

Course Website: <http://www.chem.pdx.edu/~atkinsdb/teach/321/>  
or [Desire2Learn](#)

**Caution!! This lab is run differently from most, so it would behoove you to read this syllabus carefully before coming to lab the first time.**

**Text:** (same as the lecture) Skoog, West, Holler and Crouch, **Fundamentals of Analytical Chemistry 8<sup>th</sup> ed.**, Brooks/Cole Thompson Learning, 2004. The laboratory experiments (Chapter 37) are now contained on a CD which came with the text in Adobe portable document (pdf) format. The CD also contains an interactive set of reading and problems on various topics in the text, as well as a number of useful modules (e.g., an interactive periodic table.) The text is extensively supplemented by web-based materials (**webnotes**) as described below. You will need to access both the **webnotes** and the material in Chapter 37 for the course, but if you are only taking the lab, please see me (Dr. Atkinson) before purchasing the text.

**Equipment:** You are required to have chemical splash safety goggles. I also recommend a lab apron or lab coat and gloves, since you will be handling strong acids and bases in this course. You will need a new bound, numbered page laboratory notebook for recording data. (The blue or black notebooks at the bookstore are acceptable, but you may have to number the pages yourself; and lab coats, goggles and gloves are available at the chemistry stockroom for a very reasonable price.) You will need the goggles and notebook for the first officially scheduled lab period. **\*\* Make sure you attend lab the first week.\*\*** *You are responsible for all laboratory equipment checked out to you.*

**Preparation:** Before coming to lab, you must have read over the applicable information on the CD (or in the text) and on the web (see schedule and **webnotes** section below) and have summarized the information into a procedure in your lab notebook. (You should not be bringing your expensive textbook to lab, where it is likely to be destroyed.) Unlike many of the labs you will take (but like the “real world”) there are real dangers in this course – strong acids and bases, oxidizing agents, flames, etc. - all of which are minimized by proper preparation and comprehension of the task at hand.

**Spreadsheets:** As part of the preparation for lab you are **required** to complete a working, interactive data analysis spreadsheet in **Excel**. Sample data for these spreadsheets can be obtained through the d2l site. The idea behind these spreadsheets is that you will only have to type your collected numbers into Excel to get your final answers for that lab period. Since you are required to present your fully analyzed results before you leave each lab period, you will find that this step greatly streamlines data workup. Graphical results (e.g., titration curves) will only be accepted in computer generated format (no graph paper.)

**If you do not have a working spreadsheet AND a summary procedure in your lab notebook before entering the lab, you will be asked to leave and make up the lab at a later time when you are prepared. (THIS ALSO CONSTITUTES AN ABSENCE)**

**Lab notebook:** You are required to keep a laboratory notebook throughout the term and will hand it in for a grade near the end of the quarter (see **Grading** section below.) Have a look at the format suggested in Chapter 2, section I of the text. You will also need a synopsis of the procedure for each experiment to work from and spaces for the data and observations to be recorded. (Your notebook is what should be open on the lab bench while you work.) You should also have a short section summarizing your results, including the mean, standard deviation, and relative standard deviation for replicate samples. The TA will write your grade here and sign it at the completion of the experiment. When graphs are produced, you should print them out and tape them in the book as results. (When I grade the notebooks, I will be looking for procedures, signed results, and graphs, as well as general features described in the text.) A good rule of thumb for these lab notebooks is that any number you physically measure should be recorded in your notebook by hand (i.e. volumes, masses, etc.). Any analysis of those numbers can be printed from your Excel spreadsheet.

**Webnotes:** This section of the course website will be indispensable for you and will be available anywhere you have access to a computer and the internet. The **webnotes** will provide you with specific information about the experiment that will be performed, as well as background on the methods and important safety information. This information is supplemented by the material on the CD from the text, to which the **webnotes** often refer. You can print all of this information out on your computer at home and produce a “hardcopy” version if you wish, but I think you will find this to be unnecessary. In reading the **webnotes**, you can extract the essential procedural details and safety information for your notebook, while familiarizing yourself with the theory behind the experiment. You will probably find it easier to identify the crucial information (“separate the wheat from the chaff”) as you go through the course, a useful skill in itself. {Hint: since the **webnotes** are an electronic media, you can “cut’n’paste” information to build procedures, which can be printed and taped into your lab manual.} Again, you will be prevented from “cookbooking” the labs using printed copies of the **webnotes**.

**Grading:** This analytical laboratory is graded on how well you do the required analyses in terms of your accuracy and precision (often 5 points each). You will present your results for the day’s lab to the TA before you leave and you will be given a grade (out of 10) on the spot. **Your numbers for the day must be turned in at least 10 minutes prior to the end of lab, regardless of whether you have finished the experiment or not** so that we can give you partial credit for what you have done, and you still have time to clean your glassware before leaving. Any data that has not been turned in by this time **WILL NOT** be accepted and you will be awarded a 0 for the day (and cannot do a make-up or re-do).

Since this is an analytical laboratory, you are expected to have a firm grasp of significant figures and how to report numbers properly. Reporting your data values improperly to your TA will result in the loss of one point for that day’s work.

There are eight graded labs for a total of **80 points**. I will grade your lab notebook at the end of the term (**10 points**) and the TA will provide an assessment of your general preparation and lab technique (**10 points**) for a total of **100 points**.

*If you finish your experiments early and feel that one of your sets of replicates is in error, you may repeat it at the cost of 1 point provided you can finish and clean up by the end of*

*lab period. If you truly botch an entire day's worth of lab data, you can come back during another section and re-do the **ENTIRE** experiment (with TA permission) to get half of the points back that you initially lost, depending upon your **new graded results**. (If you originally obtained a 2, you could potentially raise your score to a 6, if you were perfect the second time around. But if you started with an 8 you could only raise your score to a 9, so that would not be worth the effort. Also, if you originally earned an 8 and your re-do would give you a grade of 5 (a difference of -3), your final grade on the experiment would be 6).*

In keeping with the spirit of analytical chemistry, where the ability to do a task in a reasonable time (for a reasonable cost) is only slightly less important than accuracy and precision, you will only have the 3 hours and 50 minutes to get the job done each week. At the end of the allotted time, you should be done and cleaned up and have your results submitted to the TA. There is a lot of work to be done most days, but with proper preparation and attention to the clock, you should not have any problems finishing (and doing well on) each experiment.

**Missed lab / tardiness policy:** YOU MUST TRY TO ATTEND ALL SCHEDULED LABORATORY MEETINGS. If you miss a lab you must notify your laboratory instructor as soon as possible, but well before the next laboratory period. The TAs have office hours and email addresses, so it is easy to contact them. There will be one make-up laboratory session at the end of the term. If you miss a laboratory meeting, you **must** make it up during the course or at the make-up lab. If you miss two or more labs, you **will fail** the course. Tardiness: If you are more than 15 minutes late to lab, you will be marked late, and may be told to leave, depending on how late you are. If you are repeatedly late, you **will fail** the course.