

SYLLABUS

Chemistry 321 - Quantitative Analysis Laboratory

Summer 2016 – Dr. Atkinson, SRTC-476, AtkinsonD@pdx.edu

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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, used optionally as a reference) Harvey, but I also have some experimental sections from Harris and Skoog that I found on the web (email me if you want them). The primary source of information for the lab is a set of web-based materials (***webnotes***) as described below.

Equipment: You are required to have chemical splash safety goggles and to wear the lab coats and gloves that are provided, 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 composition notebooks at the PSU bookstore are acceptable, but you may have to number the pages yourself. Goggles 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 the first lab or you may lose your spot.**** *You are financially responsible for all laboratory equipment that you break.*

Preparation: Before coming to lab, you must have read over the applicable information on the web (see schedule and ***webnotes*** section below) and if necessary, the background information from the text, and have summarized the information into a short procedure in your lab notebook (bullet points are better than blocks of text). We find that the act of writing out the procedure cements it into the minds of many students and allows them to customize it to highlight perceived difficulties and dangers. *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 each lab you are **required** to complete a working, interactive data analysis spreadsheet in **Excel**. A sample data spreadsheet is downloaded from the [D2L](#) site at the beginning of the term that has data for all the experiments (in tabs) and the “answer” for that set of data, so you can check your work. *The idea behind these spreadsheets is that you will only have to type your data into Excel to get your final results 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 have not submitted a working spreadsheet OR don't have a 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 as explained below.)

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). You will 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 will 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 initial it at the completion of the day's experiment. When graphs are produced, you will print them out and tape them in the book as results. *When we grade the notebooks, we will be looking for a table of contents (first page of the notebook), procedures, signed results, and graphs.* A good rule of thumb for lab notebooks is that any number you physically measure (volumes, masses, etc.) should be recorded in your notebook while 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 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 from the text and other resources like the web. You can print the **webnotes** 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 valuable skill in its own right.*

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 15 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.

For this summer there are seven graded labs for a total of **70 points**. The TA will also grade your lab notebook at the end of the term (**10 points**) and provide an assessment of your general preparation and lab technique (**10 points**) for a total of **90 points**. Typically total scores of 90% and above get A grades and 80% and above Bs.

*If you finish your experiments early and feel that one of your replicates is in error, you may repeat it, provided that 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 on 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 must 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 TA's email addresses are given above and this is the best way to let them know. If you miss a laboratory meeting, you **must** make it up during the course since there is no make-up lab in the summer. 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.

Special Notice for Summer 2016, first session: The Independence Day holiday on Monday July 4, 2016 means we don't have lab that day. For the Tuesday, Thursday lab session, we will skip the last day of lab (the day of the final exam in the lecture) to maintain parity.