

Course Goals

Required course in Chemistry

- Help develop excellent lab skills
- Increase your own confidence in the lab
- Understand the principles of chemical measurement methods

Performance focused course

- Lab grades are 35% of total
- Lab grades are heavily based on your accurate measurement and analysis of unknown samples

Know how to achieve *Good Measurement*

- Generate the *Correct Answer*: a good number

Q: What does it take to get a good number?

A: Excellent skills, quality reagents & methods.

Q: How good is the number you get?

A: Analysis of possible sources of error.

Q: How do we know we can trust it?

A: Knowledge of the methods. Application of statistics.

CHEM 2272 Course Objectives

- How to identify a problem (analytical chemistry)
- To identify the best way to answer the problem
- How to prepare such that the best answer is obtained
- How to perform measurements
- How to analyze present and report data
- How to draw conclusions based on the exp. evidence

How to do well in CHEM 2272

- Being careful, clean, diligent and meticulous matters!
- Consistency matters!
- Details matter!
- Being careful is better than being fast.
- Efficiency matters.
- Physical meaning behind the analyses.

Why bother with titration?

- good pair of hands
- good foundation of analytical chemistry (pH, other equilibria)

Title: Chemical Technician, Exciton Technologi

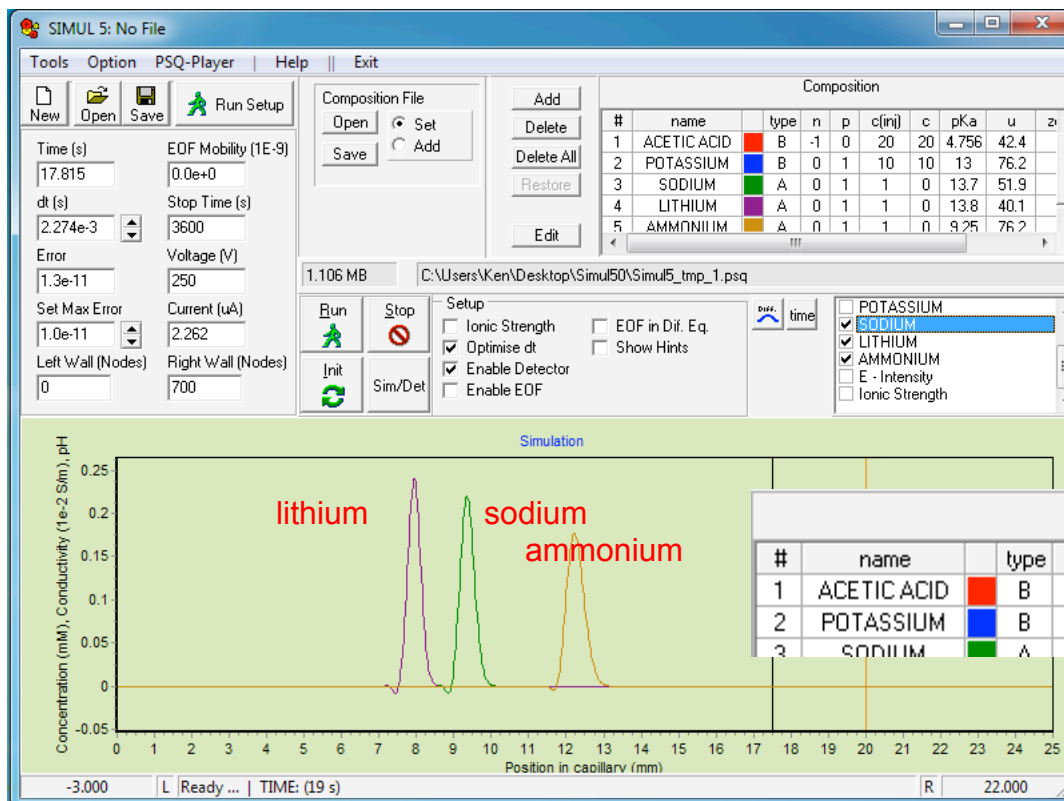
Salary: To be negotiated

Education & Experience:

- Graduated with BSc in chemistry or related field
- Superior analytical skills, UV/Vis spectrophotometry, and pH electrode
- Reading and interpreting results and drafting scientific reports
- Ability to meet deadlines
- Problem solving and multitasking capabilities

Duties & Responsibilities:

- Perform analytical and inorganic labor work following standard operating procedures
- Assist with developing standard operational procedures.
- Work on interdisciplinary teams that include engineering, regulatory affairs, marketing, business development, and project management
- Follow required instrument calibration and maintenance procedures
- Accurately record all results and prepare lab reports on test results



Chemistry 2272 Laboratory

The laboratory in CHEM 2272 begins next week (week of Sept 20)

Read - Sections 1, 2** and 3 of Lab Manual

Bring to the first laboratory period:

1. Chem 2272 Lab Manual
2. A blank lab note book
3. Safety glasses
4. Lab coat

** If you are familiar with spreadsheet, complete the Excel exercise (Sec. 2) before coming to the lab.

Lab Schedule		
	Group 1	Group 2
Sept 13 - Sept 17	No Labs	
Sept 20 - Sept 24	Check-in, Excel (2), Vol. calibration (3)	
Sept 27 - Oct 1	continue - Vol. calibration (3)	
Oct 4 - Oct 8	Acid-base Titration (4) - week 1	
Oct 11 - Oct 15	Thanksgiving, no labs	
Oct 18 - Oct 22	Acid-base Titration (4) - week 2	
Oct 25 - Oct 29	Calcium in Limestone (5)	
Nov 1 - Nov 5	Manganese in Steel (6)	
Nov 8 - Nov 12	UV-Vis (7)	Redox (8)
Nov 15 - Nov 19	Redox (8)	UV-Vis (7)
Nov 22 - Nov 26	Atomic Spec (9)	GC (10)
Nov 29 - Dec 3	GC (10)	Atomic Spec (9)

Working in the Lab

Lab Times

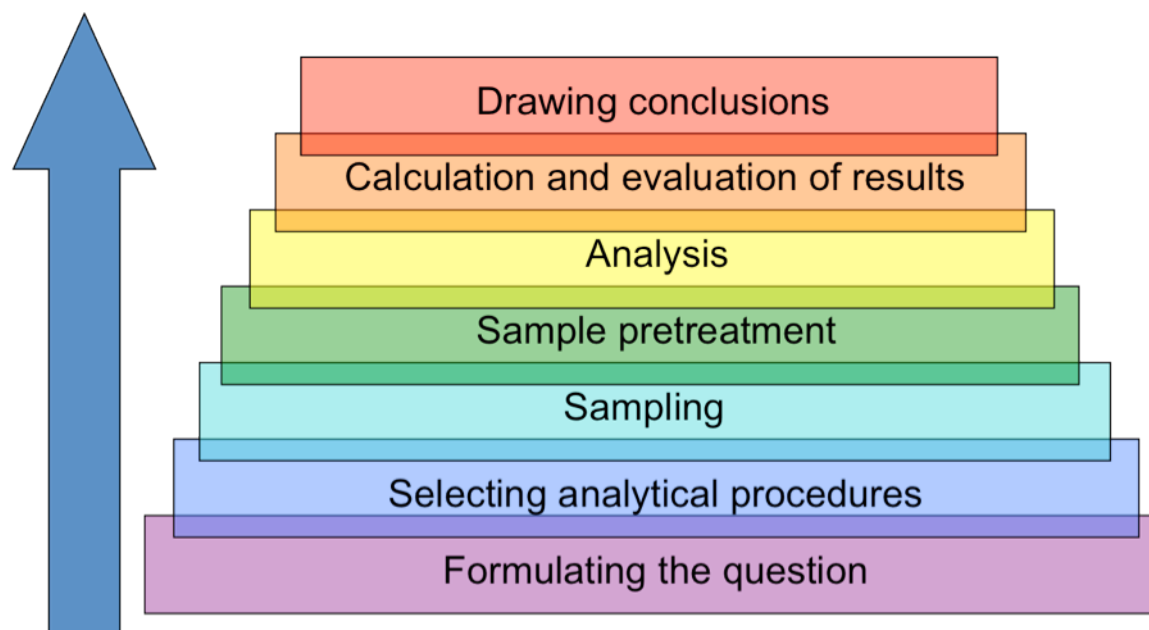
- Lab opens at 2:30 PM (9:30 AM for morning labs)
- Lab closes at 5:30 PM (12:30 PM for morning labs)
- Work stops at 5:15 PM (12:15 PM for morning) and clean-up begins

TA's are instructed to be very strict about closing times!

A clean lab is a happy & safe lab

- Clean up after yourself
- Keep books, coats, bags etc off the floor
- Start by assuming your glassware will need cleaning

General Steps in a Chemical Analysis (Sec. 0-2) - Harris



Concepts of Chemical Analysis

1. Definition of the problem

What are we analyzing for?

What kind of sample is it?

e.g., chlorohydrocarbons in river sediment, a specific antibody in blood, or Ni in an ore sample

2. What analytical method will we use?

Availability, cost, sensitivity, sample volume
Chem 2272 (classical) or 3372 (instrumental)

3. Sampling of the material

How do we get a “representative sample”?
e.g., how do we learn the average ascorbic acid content of an orange in a truckload of oranges?

4. Sample preparation or pretreatment

Prepare chemical of interest into state in which it can be measured
“analyte” = chemical of interest
e.g., how to dissolve sample (Canadian pennies) to give Cu^{2+} (aq) - Chem 3372

Eliminate interferences from other components of the sample
“matrix” = chemicals other than analyte in sample
e.g., what pH to titrate Ca with EDTA in the presence of Mg (limestone) - Sec. 5, 2272

5. Measurement

Perform analysis of the analyte
In Chem 2272 (early part) by titrations
In Chem 2272 (later part) and 3372 with instruments

6. Calculation and Evaluation of Results

Check carefully for calculation errors
Evaluate quality of results
Decide to repeat if need be

Chem 2272 will focus on steps 4, 5 and 6

Each of these steps is critical to good quality results.
Each step must be performed correctly to get a good result and a good mark.