

University of Rhode Island
Department of Chemistry
CHM 212 Quantitative Analysis Lab, Fall 2023

To enter the laboratory, you must wear a lab coat and goggles.

Objectives

This quantitative analysis laboratory course is designed to give you an opportunity to learn and practice standard analytical laboratory techniques. The emphasis will be on proper handling of glassware and chemicals, the accuracy of your results, and the understanding of the calculations performed in your analysis of the experiment. This course should provide you with proficiency in the techniques that you will use in any other laboratory setting.

Professors

Prof. Jiyeon (Jay) Kim
Beaupre 374D
jkim25@uri.edu (Please put CHM212 in the subject line)

Labs

T/W, 2:00-4:45, Beaupre 165

Teaching Assistant

Anuradha KC, anuradha.kc@uri.edu

Office Hour by appointment

1. Google hangout.
2. Visit in Beaupre 340.

Safety

Safety is the top priority in this lab course, especially this pandemic season. Unsafe practices will not be tolerated, and will result in losing points for that day's work. Keep the following in mind at all times:

- Before entering the lab, you must be wearing your lab coat and safety glasses.
- Nitrile gloves are required for each experiment, and at least one glove must be removed when leaving the room. Do not touch doorknobs, light switches, the ice machine, etc. with a gloved hand.
- Close the waste container when you are done, even if there is somebody waiting in line behind you. Never walk away from an open waste container, this will result in the department getting fined if a safety officer sees it happen.
- Try to minimize your wastes.
- Never fill a buret above your head, always ensure to lower the top of it below your shoulder height.
- Be familiar with the MSDS information of all chemicals being used in lab before you begin the experiment.

Accommodations for Sickness:

Any student absent from the lab due to a sickness needs to immediately contact me or Anuradha by email. We may arrange reasonable accommodations. For this accommodation, an official document or letter is needed.

No early leaving for Thanksgiving will be accommodated.

Lab Practices

Throughout the semester, you will experience various techniques for using glassware, weighing out chemicals, taking measurements, and quantitatively analyzing data.

Materials for Experiments

Reading material for experiments, lab schedule will be posted in the **Brightspace**.

Lab Notebooks

Keeping a neat and organized lab notebook is a valuable skill for any scientist. Your notebook will be an important part of this course, and you must follow certain guidelines for keeping a scientifically acceptable record of all your experiments.

- First page will be a cover page, second page should be a table of contents, on the third page draw the lab layout (with locations of safety features) and evacuation route.
- All entries must be in pen.
- Errors must be crossed out with a single line, and then initialed and dated. Do not scribble things out.
- Always start from a new day on a new page, and put a line through any blank space at the end of a day's entry. Never go back and change an old entry.

Lab Reports

Lab reports will be due at the start of your lab session. **Please submit a single pdf file or word file by email.** Each lab is graded according to the rubric in the instructions given out in lab. Lab reports constitute **25 %** of the overall grade. You are allowed to pass in 1 lab report up to 1 week late. You will lose 20% of the grade if it is late. No further late lab reports will be allowed. A second late lab report will have a zero for a grade.

Lab Final

You will be expected to do an experiment and calculate mathematical results for your final. It will be held during your regular lab time and will involve an unknown chemical that must be identified and quantified using the techniques you learned in the lab. You will be expected to do out all calculations during the lab that you need to support your results. Your grade on the final will be based on the accuracy of the results and is worth **10 %** of your overall grade in the course.

Late Policy

This is a course with weekly lab in order to meet the aims of the course. It's easy to get away from you without deadlines and enforcement of those deadlines is meant to be helpful. In addition, timely submission of work is respectful of your TA's time and effort.

All work must be handed in within 15 minutes of the start of the lab session. Loose-leaf sheets must be firmly secured together, preferably by stapling. Lab reports will be due within one week of completion of the lab work, unless the TA informs you otherwise. Late work will be deducted 5 % per day, but will receive a grade of 0 if it is received after the fourth day. Similarly, if more than 2 lab reports are received late, the magnitude of the daily deduction will be increased and the reports may receive a grade of 0 when late. We will do the same in adopting approaches, when warranted and possible, such as make-up lab period. Such approaches must hew to both the calendar and the overall course requirements.

If you are struggling, please reach out to your TA or to one or both of your professors.

Teaching Assistant

Please contact your teaching assistant by email if you want to set up an appointment to review any of the material in the course or get help with calculations.

Your TA will give a brief overview of the theory and instrumentation being used in the lab at the start of each experiment. You will be expected to read up on each technique on your own before the experiment starts. You will be expected to know the general theory, instrumentation, applied mathematical calculations and the advantages/disadvantages of all the instruments presented in the course for the final, so take notes early.

Missed lab and Makeup

Ideally you will be able to attend all your labs. Due to the limited resources, we offer one makeup week for your missed lab. If you miss more than two labs without making them up, you will have 0 grades for each missed lab.

Outstanding Bills

Bills must be paid by the first reading day after classes end. If you have an outstanding bill at that time you will have a hold put on your account.

Academic Honesty

Academic dishonesty in any form is considered a serious offence, and disciplinary action will be taken immediately. The URI policy on academic honesty is detailed in the student handbook (available online), and it is summarized below:

Students are expected to be honest in all academic work. A student's name on any written work, including assignments, lab reports, papers, or exams, shall be regarded as assurance that the work is the result of the student's own thought and study. Work should be stated in the student's own words, properly attributed to its source. Students have an obligation to know how to quote, paraphrase, summarize, cite and reference the work of others with integrity. The following are examples of academic dishonesty.

- Using material, directly or paraphrasing, from published sources (print or electronic) without appropriate citation
- Claiming disproportionate credit for work not done independently
- Unauthorized possession or access to exams
- Unauthorized communication during exams
- Unauthorized use of another's work or preparing work for another student
- Taking an exam for another student
- Altering or attempting to alter grades
- The use of notes or electronic devices to gain an unauthorized advantage during exams
- Fabricating or falsifying facts, data or references
- Facilitating or aiding another's academic dishonesty
- Submitting the same paper for more than one course without prior approval from the instructors.

When there is an allegation of academic dishonesty, the instructor may:

- Fail the student for the assignment, or recommend that the student fail the course.

Students in CHM 212 lab are permitted to work in groups on assignments and reports, but the names of all participating students should appear on each submitted assignment and report. If one student in particular is responsible for a key concept in the solution or write-up, then s/he should be given explicit credit right next to that line of the report. Note that all submitted work must still be completed by each student in his or her own words: shared text is not permitted.

Anti-Bias Statement: We respect the rights and dignity of each individual and group. We reject prejudice and intolerance, and we work to understand differences. We believe that equity and inclusion are critical components for campus community members to thrive. If you are a target or a witness of a bias incident, you are encouraged to submit a report to the URI Bias Response Team at www.uri.edu/brt. There you will also find people and resources to help.

The University of Rhode Island occupies the traditional homelands of the Narragansett Nation. What is now the state of Rhode Island occupies the traditional homelands and waterways of the Narragansett Nation and the Niantic, Wampanoag and Nipmuc Peoples. We honor and respect the enduring and continuing relationship between these nations and this land by teaching and learning more about their histories and present-day communities, and by becoming stewards of the land we too inhabit. In addition, let us acknowledge the violence of conquest, war, and dispossession and of enslavement endured by Black and Indigenous communities in what is now the United States. Their contemporary efforts to endure in the face of colonialism must be acknowledged, respected and supported.

Lab Report Format

Cover Page

You must have a separate cover page with the following information. Chemistry 212 and the title of the experiment should be near the top of the page in a size 18 font. Then centered on the page in a size 12 font should be the following information; student name, station number, section, TA's name, date of experiment.

The following sections should be in the order as given below

Purpose of Experiment

In this section, you must state in your own words what you are expected to learn from the experiment in terms of the theory presented in the lecture. The purpose will not necessarily be given directly out of the text in the laboratory manual. This section should be approximately 5-10 sentences long.

Procedure

The procedure must be written in your laboratory notebook before lab and the carbon copy included in your lab report.

Calculations

Neatly write or type out 1 example from each of the calculations given in the Calculations section of the lab report. Include the heading of each calculation exactly as written in the lab manual and in the order given in the lab manual. Show all work for each calculation. Your calculations must match the data recorded on the original data sheet or you will receive no credit for this section.

Points in this section will be awarded at the TAs discretion in terms of the values being correct or incorrect. If an error is made in an early calculation where the result is needed later, no points will be deducted for an incorrect final answer as long as the work shown is correct. Use dimensional analysis to show all work.

All answers must have the correct number of significant figures based on the data recorded and any numbers less than 1 must have a leading zero included. If the significant figures are incorrect, you will be given a 5 point deduction on the lab report.

All answers must have the correct units recorded with the answer. If units are not used, or are incorrect, you will be given a 5 point deduction on the lab report.

You may use as many pages as necessary in this section, but they must be on the same paper as you have submitted with the rest of the lab report. If you need lined paper, put a piece of lined paper under the white paper when writing out your calculations so you can see the lines through the white paper.

Calculations must be neat enough for the TA to read all the numbers. If the TA cannot read the calculation clearly, then no credit will be given for that calculation. Calculations must be either typed or neatly written in black ink.

Results

Include a table or tables with all the results from all the calculated values included in the experiment. You can either use a spreadsheet program and paste the table into the results section or type the results section in yourself as a table. Handwritten results or non-tabulated data are not acceptable. You must include the results for all trials performed in the experiment.

Your calculated values must be reasonable. For example, if you calculate that you show that you produced 10,000g of material in the experiment simply because that is how the calculation worked out, you will not receive any credit for that result. If you feel your results are incorrect, you must contact your TA before the lab report is passed in to find out why you went wrong. You will not receive credit for an answer if it does not make logical sense.

All answers must have the correct number of significant figures based on the data recorded. If the significant figures are incorrect, you will be given a 5 point deduction on the lab report.

All answers must have the correct units recorded with the answer. If units are not used, or are incorrect, you will be given a 5 point deduction on the lab report.

Conclusions

You must include any final results from your calculations and any errors associated with them. If a percent error was calculated, it must be included. If the percent error was not calculated or is greater than 5%, then you must describe briefly where errors could have been propagated that are specific to your experiment. Saying "balance error" is not good enough. It must be an error that you were unaware of at the time it was generated; otherwise you would have been expected to redo that portion of the experiment. It could also be an error over which you had no control, such as the room being too warm or cold to take pH measurements or not being able to scrape off the filter paper to collect all of a product.

All conclusions must be in complete sentences. Just listing the values of the results will not count.

As a closing, you need to include a sentence or two regarding how well the results you obtained match the purpose of the experiment. If you feel that you did not achieve these goals, you need to specifically state what you think went wrong and how you would change what you did if you were to repeat the experiment.

Pre-lab and Post-lab Questions

There will be a varying number of questions for each experiment. These questions have been designed to require you to match your specific results to the questions being asked. You should not have the same answers as any other students, even if you worked together in the lab. There will always be a "thought" component to each question that is based on your individual perception of the experiment. No credit will be given to either student if your answers are identical, or nearly identical to those of another student.

If a calculation is required in a question, it can be neatly hand written in black ink. Otherwise all answers must be typed. No credit will be given to handwritten text answers.

All answers must be in full sentences. If you have to show a calculation for the question, you need answer the question with your results in typed sentences, then show the calculation after the typed portion of the question. Your calculations must be included as part of the answer. The written answer and the worked out calculation must be on the same page. If they will not fit together on the same page, then start a new page for that question. If the answers to the question are relatively short, then you can put more than 1 question on a single page. Do not split up the question; if it won't fit on the page, start a new page. You must label each one and they must be written in the order given in the laboratory experiment.

Original Data

Include the original data sheets from your experiment. It is imperative that the data sheet be signed or it will be considered invalid. If you did not get your data signed, you will not get any credit for this section of your lab report. Be sure to include all data that was collected in the lab. If more than 1 data page was used, each sheet must be signed separately.

Any changes to data that are not initialed by your TA during the experiment will be considered invalid and all calculations done with this data will also be invalid. Do not change any data without getting your TA's initials that the change was made during the lab experiment

Grading Rubric

Include a copy of the lab report rubric as the last page of your report.

Lab Report Rubric: This sheet must be attached as the last page of your lab report

Points:

_____	Format	5pts	_____	Does not match template	_____	Sections not bolded, underlined or typed
			_____	Sections of report are missing	_____	Sections out of order
_____	Purpose	5pts	_____	Does not match actual goals	_____	Not completed in 5-10 sentences
_____	Procedure	5pts	_____	Not prepared prior to lab	_____	Changes missing
_____	Calculations	20pts	_____	Calculations are incorrect	_____	Calculations do not match original data
			_____	Calculations are illegible	_____	Calculations are out of order or unlabeled
_____	Results	20pts	_____	Results do not make sense	_____	Results are out of order
			_____	Results do not match calculations	_____	Results are missing, not tabulated or inaccurate
_____	Conclusions	15pts	_____	Error sources are specific to experiment		
			_____	Results are missing		
			_____	Discrepancies between data collected and expected results are not explained		
			_____	Final sentence about success in relation to purpose is unclear or missing		
_____	Questions	20pts	_____	_____		
			_____	_____		
			_____	_____		
			_____	_____		
			_____	_____		
			_____	_____		
_____	Original Data	10pts	_____	Data is not in black pen	_____	Data is illegible
			_____	TA initials missing on changes	_____	Data is incorrect or missing
_____	Total Score	100pts				

Deductions:

_____	10pts	Checklist missing
_____	5pts	Incorrect significant figures or no leading zeros on numbers
_____	5pts	Incorrect or missing units
_____	5pts	Incomplete sentences or wording that makes no sense
_____	5pt/incident	Portions of the lab report other than calculations and data are hand written
_____	50pts	Original data sheet missing or not signed by TA
_____	50pts	Calculations not performed with data from data sheet:
_____	100pts	Plagiarism (copying from another source):
_____	10pts	Lab Area left unclean
_____	20pts	Improper waste disposal
_____	20pts	Disruptive behavior or lab safety issue (At TAs discretion)

_____ Final Score _____ Other: _____