

Chemistry 3005
Quantitative Analysis Laboratory
Fall 2016

Course Name: Quantitative Analysis Laboratory

Time/Location: M 2:30-5:20 or Th 12:30-3:20 p.m. ML-144

Instructor: Robert Brown Office W026 Phone: 797-0545, email: bob.brown@usu.edu

Teaching Assistant: Kate Mendenhall (cadence.simpson@aggiemail.usu.edu).

Dr. Brown's Office Hours: Tu 3:00-4:00 PM, W 3:00-4:00 PM and by appointment.

Teaching Assistant office hours will be announced at the first laboratory meeting.

Text: USU Department of Chemistry and Biochemistry Chemistry 3005 Laboratory Manual. A copy will be provided to each student and an electronic version will be available on Canvas.

Required Materials: A bound laboratory notebook, safety goggles; a laboratory coat, pencil, pen, etc.

Course Content: This course consists of 8 laboratories. Laboratories include experiments in volumetric, gravimetric, and instrumental methods of chemical analysis. Instrumental methods include: electrochemistry, emission and absorption spectrophotometry, and ion exchange and gas chromatographic separations.

Course Grading: Course performance will be evaluated based on the accuracy of reported experimental results, two laboratory notebook checks (scored based upon proper data entry, general quality of notebook entries and answers to pre and post lab questions associated with the various experiments) and an in-class final quiz.

Grading Points Breakdown: Each experiment has a maximum score of 100 points. Laboratory notebook checks will count 50 points each. The final quiz is 100 points.

| Maximum Points | Task |
|-----------------------|----------------------------|
| 800 | 8 Experiments |
| 100 | Laboratory notebook checks |
| 100 | Final quiz |
| 1000 | Total Points |

The maximum letter grade ranges will be: A, 90-100%; B, 80-89%; C, 70-79%; D, 60-69%. These ranges may be adjusted lowered but will not be raised. Plus (+) and minus (-) grade modifier will also be used. See lab manual for more details on grading and lab result due dates.

Withdrawal Policy: This course will follow the University policy on withdrawals stated in the current Undergraduate Catalog. Drop dates are listed in the Schedule of Classes. You must check out of the laboratory (as outlined in the laboratory manual) if you drop the class. You must clean your glassware and return your lab drawer key. **Note: failure to do so will result in a hold on your academic records until this is completed. Failure to return your lab**

drawer key will result in a fine (cost of replacing the drawer lock) that will need to be paid before the hold on your records will be released.

Missed Laboratory Policy: Due to the number of laboratories and their associated scheduling, there will generally be no opportunity for students to makeup laboratories. Students are required to attend all laboratories as scheduled (see laboratory manual). **Due to space limitations and safety concerns, students may only attend the laboratory section for which they are registered unless prior approval is obtained from the Instructor.** A missed laboratory due to a documented illness, family emergency or a university-approved absence will be dealt with as to final course grade by the instructor on a case-by-case basis.

Late submission of laboratory results will be penalized 5 points for the first late day and up to 10 additional points per week that the results are late. No repetition of experiments is permitted once a result is submitted.

Attendance Policy: Laboratory attendance is mandatory for successful performance in this course. Laboratory attendance is monitored each week and failure to attend without an acceptable excuse will result in a grade of zero for that laboratory.

Student Disability Statement: Any student with a disability that requires accommodations must contact the Instructor. The disability must be documented by the Disability Resource Center. Course materials may be requested in alternative formats.

Laboratory Fee Statement: A laboratory fee (\$75) is required for this course. The laboratory fee is used to pay for reagents, help maintain the instrumentation and glassware and covers a small portion of the lab Teaching Assistant's support.

Assessment Statement: The value of a quantitative chemical analysis laboratory is to develop the necessary laboratory skills to be able to perform accurate and reliable experimentation in a variety of scientific fields. Laboratory learning objectives are evaluated by comparing student results of analyzed unknowns to those reported in previous years.

Learning Objectives:

- Comprehend the importance of stoichiometry, chemical equilibrium and kinetics in analysis.
- Understand laboratory and chemical safety
- Formulate concepts of validation of data and experimental design
- Comprehend concept of and perform chemical measurement calibration
- Apply and assess concepts of availability and evaluation of analytical standards and formulate standardization methodology
- Demonstrate knowledge of sampling methods for all states of matter
- Use statistical methods for evaluating and interpreting data
- Assess sources of error in chemical and instrumental analysis and account for errors in data analysis
- Recognize interferences in chemical and instrumental analysis
- Apply theory and operational principles of analytical instruments
- Demonstrate practical aspects of theoretical principles discussed in the Chem 3000 course