

Quantitative Analysis

CHEM 20123, Spring 2010

Lab Lecture:	Wednesday, 1:00 - 1:50 PM (SWR LH 4)
Laboratory:	Wednesday & Thursday, 2:00 - 5:00 PM (SWR 400)
Instructors:	Bob Neilson (SWR 437, 817-257-7345), R.Neilson@tcu.edu Julie Fry (SWR 441, 817-257-4194), J.Fry@tcu.edu
Office Hours:	Same times as General Chemistry (Chem 10123)
Graduate TAs:	Boran Shi ("Bill" boran.shi@tcu.edu), Michele Schultz-Russell (m.d.russell@tcu.edu)
Undergrad TAs:	Kara Brusoski (k.brusoski@tcu.edu) Alexi Bulloch (alexi.bulloch@tcu.edu) Tracy Cable (t.cable@tcu.edu) Brittany Casares (b.casares@tcu.edu)
Prerequisite:	General Chemistry I (CHEM 10113 and prior or concurrent enrollment in CHEM 10123)
Textbook:	Daniel C. Harris, <i>Exploring Chemical Analysis</i> 2009, New York; W. H. Freeman & Co (4th edition)

Course Objectives

Students will master the techniques, theory, and laboratory practice of quantitative chemical analysis, focusing on gravimetric and volumetric analysis, and will gain an introductory understanding of instrumental methods of chemical analysis.

Course description

Laboratory. This course consists primarily of laboratory sessions (6 hours per week) which are intended to cover a variety of analytical techniques as illustrated in experiments selected from among the following examples.

- Calibration of glassware
- Gravimetric determination of calcium
- Gravimetric determination of iron
- Gravimetric determination of chloride
- Fajans determination of chloride
- Determination of potassium hydrogen phthalate
- Determination of sodium carbonate
- EDTA determination of magnesium
- Determination of calcium using potassium permanganate
- Iodometric determination of copper
- EDTA determination of calcium and magnesium in tap water

Detailed information and instructions pertaining to specific lab experiments, reading assignments, homework problems, etc will be provided each week.

Lecture. An additional one hour lecture class each week is intended to provide theoretical background for the experiments by supplementing the relevant course material in General Chemistry, CHEM 10123. Major topics to be covered in lecture will be *selected* from among the following chapters.

- Introduction to chemical analysis (Chapters 0 - 2)
- Basic math and statistic tools (Chapters 3 - 5)
- Gravimetric analysis (Chapter 7)
- Volumetric analysis and precipitation titrations (Chapter 6)
- Chemical equilibria and Acid-Base titrations (Chapters 1, 8 - 10)
- Complex ion formation and equilibria, EDTA titrations (Chapter 13)
- Electrochemistry and redox titrations (Chapters 14 and 16)

Grading Scheme

Lab Experiments (lowest one dropped)	60 %
On-Line Quizzes & Lab Notebooks	10 %
Hour Exam 1 (<i>Wednesday, March 3</i>)	15 %
Hour Exam 2 (<i>Wednesday, April 21</i>)	15 %

The laboratory grade is based on the determination of about 10 unknowns of which the grades are based almost entirely on the accuracy of the determinations. A brief lab report (one page max), listing the results and showing a sample calculation, is required for each experiment. Report forms are provided on-line and the reports are submitted as e-mail attachments.

LAB SAFETY

Laboratory safety is of primary importance! All students must carefully read and sign a copy of the **Laboratory Safety Rules** before being allowed in lab. Students who fail to wear safety glasses or otherwise violate important safety rules will be dismissed from lab with a grade of zero for that experiment.

Attendance Policy

The only acceptable excuses for missing class or laboratory are:

1. an Official University Absence,
2. a written medical excuse including the physician's name and contact information,
3. a written notice from the Dean of Campus Life about a major personal problem such as a death in the family.

Please notify the course instructor of your excused absence in advance if possible in order to schedule a makeup in another laboratory session. Laboratories and/or exams missed due to unexcused absences will be given a grade of zero. Laboratories or exams missed because of excused absences will be made up as arranged with the course instructor.

Statement on Disability Services at TCU Texas Christian University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 regarding students with disabilities. If you require accommodations for a disability, please contact the **Coordinator for Students with Disabilities in the Center for Academic Services, located in Sadler Hall 11**. Further information can be obtained from the Center for Academic Services, TCU Box 297710, Fort Worth, TX 76129, or at 817-257-7486.

Adequate time must be allowed to arrange accommodations and accommodations are not retroactive; therefore, students should contact the Coordinator as soon as possible in the academic term for which they are seeking accommodations. *Each eligible student is responsible for presenting relevant, verifiable, professional documentation and/or assessment reports to the Coordinator.* Guidelines for documentation may be found at

<http://www.acs.tcu.edu/disability.htm>. Students with emergency medical information or needing special arrangements in case a building must be evacuated should discuss this information with their instructor/professor as soon as possible.

Academic Misconduct (Sec. 3.4 from the Student Handbook) Any act that violates the academic integrity of the institution is considered academic misconduct. The procedures used to resolve suspected acts of academic misconduct are available in the offices of Academic Deans and the Office of Campus Life. Specific examples include, but are not limited to:

1. Cheating: copying from another student's test paper; using programmable calculators, portable computers and cell phones during the test without permission; collaborating with or seeking aid from another student during a test or laboratory without permission; substituting for another student or permitting another student to substitute for oneself.
2. Plagiarism: the appropriation, theft, purchase or obtaining by any means another's work, and the unacknowledged submission or incorporation of that work as one's own offered for credit.
3. Collusion: the unauthorized collaboration with another in preparing work offered for credit.