

Instructor: Dale Russell, Ph.D. Office: SN 316 Phone: 426-3975 Chem Dept: 426-3000
e-mail: drussell@boisestate.edu

Office Hours: Mon., Tue. 2- 3 pm; Other times by appointment

Textbook: Daniel C. Harris, Quantitative Chemical Analysis, 7th Edition; publisher: W.H. Freeman and Co. 2007.

All reading assignments and homework problems will be made in this textbook unless otherwise indicated. All topics covered in the course can be found in this textbook, by referring to either the table of contents or the index, except those for which special handouts will be provided.

Week of:	Topics to be Covered	Chapter(s)
Jan 15	Introduction, the analytical process, intro to statistics	0, 1, 3
Jan 22	Error analysis and statistics; Confidence Intervals, Tests of Significance	4, App. C
Jan 29	Sampling, Standardization, Calibration	5, 28, App.B
Feb 5	Chemical equilibria; general titration theory	6, 7
Feb 12	Ionic strength and activity coefficients; Systematic treatment of equilibria	8
Feb 19	Precipitation equilibria and gravimetry	27
Feb 26	Acid-base equilibria: monoprotics	9
Mar 5	Polyprotic systems	10
Mar 12	Acid-base titrations	11
Mar 19	Complexometric methods of analysis	12
Mar 26	<<< SPRING BREAK >>>	
Apr 2	Fundamentals of electrochemistry	14
Apr. 9	Electrodes and potentiometry	15
Apr. 16	Analytical electrochemistry, selected topics	16, 17
Apr 23	Spectroscopy, selected methods	19-21 (parts)
Apr 30	Analytical separations, selected topics	23-26 (parts)

Note: Chapter 2 is not covered in lecture. Most of this content is covered in lab.

Exam Dates Wed, Feb.7 Mon., Mar.5 Mon., Apr 2 Fri, Apr 27

Final Exam: Wed., May 8, 8 – 10 a.m.

Expectations:

Student Code of Conduct: Guidelines and rules published by Boise State University are required of all students at all times on campus. Students should be familiar with this code. Adherence to these guidelines will be used as one factor in assigning final grade, if your score is borderline.

Schedule of Topics , above, is approximate.

Overheads, Class Notes, and Exams from Previous Years: Will be available via "BlackBoard"

About the Exams: Exam DATES are fixed, and will not change. Exam CONTENT will depend on how much material is actually covered in lecture before the exam date. All topics covered in class prior to an exam may be covered on that exam. Topics not discussed in lecture will not appear on an exam, unless specifically stated in advance. Final exam is **non-optional** and will be required of all students.

Quizzes: A total of 100 points will accumulate for **unannounced** quizzes to be worked in class, or as take-home quizzes. These 100 points can replace one midterm exam score.

Homework: Will be assigned one or more times per week from the textbook. Problems will be graded by “spot checking” of one or more problems per assignment. A total of 50 points will accumulate for homework problems.

Course Grade: Grades will be computed based on the mid-terms (100 pts each), the quizzes (100 points total), the homework (50 points) and the comprehensive final (200 pts). The lowest mid-term grade will be dropped, or if the quiz grade is lower, it will be dropped, and the four midterms retained. There will be no make-up exams under any circumstances without **prior** arrangement with the instructor. A missed exam will be considered a grade of zero (0) and may count as your dropped mid-term. The course grade is computed as follows:

Three best midterms and the quiz grade (or all 4 midterms without the quiz grade), plus the homework grade **and the final**, combined. Grade is assigned as a percentage of total points possible (650 points).

Grades will be assigned according to the following scheme:	90-100 %	A
	80-89	B
	70-79	C
	60-69	D
	< 60	F

Attendance: Attendance will be taken but will not count directly toward the course grade. Attendance will be used as one factor to assign grades to students on the borderline between two letter grades. Regular attendance and positive attitude in class may result in your receiving the **higher** grade.

If you are absent: It is **solely the student's responsibility** to determine if work or assignments have been missed, and to obtain copies of handouts provided during your absence. The instructor will not track you down to give you this information!!!

About Non-attendance: The instructor will not submit drop/add paperwork for you. It is absolutely the student's responsibility to drop the course, if that is the intention. Otherwise, a grade of F will result.

Relationship Between Lecture and Laboratory: There is a close link between the lecture and the lab. While lab is not required as a co-requisite, the concepts studied in lecture are being reinforced and practiced in the lab. Students not enrolled in lab should visit the lab, and may wish to obtain a copy of the lab manual.

Learning Objectives (required by the Idaho State Board of Education)

Critical thinking and problem solving:

This aspect of learning is the main focus of the course, as it applies to problems in analytical chemistry. Students will learn theory and calculations of classical chemical analysis, including principles of sampling, chemical equilibria, and statistical handling of data. In addition, students will be introduced to modern practices in analytical chemistry including spectroscopy, chromatography and electrochemistry.

Communication Skills:

Students will work in small groups to explore complex chemical systems, and arrive at conclusions regarding some of the more difficult problems in analysis. Students will present written documentation of their problem solving skills.

Cultural Perspective:

Students will learn about contributions to analytical chemistry made by persons of both sexes and a number of ethnicities. They will see that science in general, and chemistry in particular, is a field of endeavor that is open to all people. Students will also learn how analytical chemistry applies to a number of real world issues in our increasingly technology-oriented culture. They will learn what analytical chemistry contributes toward solving social and cultural problems in such areas as the environment, health, materials for better living, energy production, and semiconductor technology.

Breadth of Knowledge and Intellectual Perspective:

Students will gain insight into connections among the various branches of chemistry, all of which are served by analytical chemistry. Student will also be exposed to connections between chemistry and the disciplines of biology, statistics, health sciences, physics, materials science, environmental sciences and geology.

Outcomes Evaluation

Students will demonstrate how well they have met the objectives through quizzes, exams, and in-class exercises. Students will also take the standardized examination in analytical chemistry prepared by the American Chemical Society. A grade of 70 % or better is required to demonstrate satisfactory proficiency, as outlined in the section on grades, above.