

Tentative Course Schedule and Overview

Chemical Equilibrium & Analysis (Chemistry 212)

4.0 credits

Fall 2020

Lecturer: Dr. Brian Rasley (REIC 178, 474-5029, btrasley@alaska.edu)
Office Hours: MWF 10:15-11:30 am or by appointment (drop-ins are welcome on a time available basis)
Lecture: MWF 9:15-10:15 am in REIC 203 Lab: M 2:15-5:15 pm; REIC 245
Text: "Quantitative Chemical Analysis", 9th ed.; by Daniel C. Harris
Required Materials: Text & WebAssign Access; non-graphing Scientific Calculator

Course Overview: Chemistry 212 is an examination of aqueous chemical equilibrium as applied to chemical analysis, separations, spectrophotometry, and other factors considered in the analytical approach. The course is delivered via traditional lectures and laboratory exercises.

Course Prerequisites: "C" or better grade in CHEM 106X and MATH 151X (or equivalents)

Additional Course Resources: See the course web page at: <https://classes.alaska.edu/>

Important Dates: Last day to drop the course without a "W" appearing on transcript Fri., Sept. 4th
(100% tuition refunded)

Last day to withdraw from the course (a "W" will appear on transcript) Fri., Oct. 30th

Policy on Cheating: Any student caught cheating will be assigned a course grade of "F".

As a UAF student, you are subject to the Student Code of Conduct (Board of Regents Policy; P.09.02). The university assumes that the integrity of each student and of the student body as a whole will be upheld. Honesty is a primary responsibility of you and every other UAF student. It is your responsibility to help maintain the integrity of the student community. In this course, the following items should be noted.

1. Students will not collaborate on any quizzes, in-class exams, or take-home exams that will contribute to their grade in a course, unless permission is granted by the instructor of the course. Only those materials permitted by the instructor may be used to assist in quizzes and examinations
2. Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses and other reports..

Alleged academic misconduct will be reviewed in accordance with procedures specified in regents policy, university regulations and UAF rules and procedures. For additional information and details about Academic Misconduct, please visit [Center for Student Rights and Responsibilities](#).

Class Participation (Active Learning):

Homework: Success in Chem 212 requires practice doing problems. Higher achievement on exams is usually a direct result of time spent doing homework assignments in their entirety.

The class will be using an online homework system called WebAssign. The **WebAssign class code** for our course is: **uaf 4155 7119** Homework assignments and due dates will be posted in the WebAssign system. Students have the responsibility of keeping track of homework assignments and due dates. Failure to enroll in WebAssign and complete the Chapter 1 Homework assignment by September 3rd will be considered a failure to participate in the course and will result in a faculty initiated drop from the course.

Other Class Participation Activities:

Group activities focusing on a particular day's reading assignment may occasionally be assigned in class. The organization of any group activities will be explained separately.

Quizzes: There may be several in-class quizzes during the semester. You will be allowed to drop the lowest quiz grade. Quiz grades will be calculated by averaging the remaining quiz scores. There will be no make-ups for quizzes. Normally, quizzes will cover the day's reading assignments as listed in the syllabus. If for some reason, we deviate from the syllabus, I will assign readings in class. The goal of the quizzes is to enable us to make maximum use of class time.

Attendance: Class attendance is both expected and required. Non-attendance of course lectures and labs are penalized as follows: Missed course lectures (-0.5% of total course grade/lecture missed); Missed lab period (-5% of total lab score/missed lab period). Five (5) or more absences from class before Oct. 30th will result in a faculty initiated withdrawal from the course.

Exams

There are three scheduled in-class hour exams during the semester plus a cumulative final. All exams count toward the course grade. Make-up exams will be not be given for **any** reason. If you miss an exam due to illness, bring a note (and contact phone number) from your physician or other health care provider in order to have your absence excused. In cases of excused absences, grades will be assigned on the basis of a percentage of the remaining total points available (In effect, each exam, quiz, etc. accounts for a larger percentage of your course grade).

**** Please note that some exam questions may be different from homework questions in the Harris text. The relative amount of time available for exams and homework, the availability of computational facilities and the goals of the two activities are very different.

Course Grading Scheme:	3 Hour Exams @ 100 Points Each	300 pts
	Final Exam (comprehensive)	100 pts
	Class Participation	100 pts
	(Homework, group activities, In-class quizzes)	
	<u>Laboratory Grade</u>	<u>100 pts</u>
	Total	600 pts

Percentages of 90, 80, 70, 60 correspond to grades of A, B, C and D. Percentages below 60 correspond to a failing grade (F). Plus and minus grades will not be awarded for this course.

University guidelines for course grades are as follows:

<u>Grade</u>	<u>University Guideline</u>
A	Indicates a thorough mastery of course content , and outstanding performance in completion of course requirements.
B	Indicates a high level of acquired knowledge and performance in completion of course requirements.
C	Indicates a satisfactory level of acquired knowledge and performance in completion of course requirements.
D	Indicates a minimal level of acquired knowledge and performance in completion of course requirements. This grade does not satisfy requirements for courses in the major, minor, core or graduate programs.
F	Indicates failure to meet the lowest standards.

Notes:

1) a satisfactory or average level of performance (a "C") includes completion of all assigned course material. At the end of the semester, I carefully evaluate every students performance in the course.

Student Responsibilities:

Students are responsible for all material covered in class lecture. If you miss class for any reason, you will need to find out what you missed (including any changes in reading assignments). Students are responsible for reading the assigned material in the text **before** coming to class. Students should keep all returned, graded assignments until after final course grades have been posted on UAonline.

Course Goals

Students should exit the course with the following skills:

- the ability to perform quantitative dilution problems
- the ability to perform intermediate level equilibrium problem calculations
- an intermediate level of understanding of spectroscopy
- an introductory level of understanding of chromatography
- an introductory level of understanding of basic statistics

Student Learning Outcomes

Student learning outcomes will be assessed via statistical analysis of selected exam questions and an assessment exam given at the beginning and end of the semester.

Disability Services (<http://www.uaf.edu/disability>)

Students with a physical or learning disability, who may need academic accommodations, should contact the Disability Services office, located in the Center for Health and Counseling (474-5655, TTY 474-1827, fax: 474-5688.) You will need to provide documentation of your disability. Disability Services will then notify the instructor of any special accommodations required for students with documented learning disabilities.

Varsity Sports and University Sponsored Activities

Students participating in varsity level sports programs and/or university sponsored activities should contact the instructor at least two weeks prior any travel or activity that will require them to be absent from class.

Student protections statement: UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site:
<https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/>.

COVID-19 statement: Students should keep up-to-date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website:

<https://sites.google.com/alaska.edu/coronavirus/uaf/uaf-students?authuser=0>

Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

Chemistry 212

Tentative Class Schedule

Fall 2020

Week	Dates	Day	Chapter	General Topics	Reading Assignments(read prior to class)
1	Aug. 24-28	M W F	0,1 2,3 3	Introduction, Review Tools of the Trade, Sig figs. Errors, Propagation of Uncertainty	Ch 0 & 1 (pp.1-21) Ch 2 (pp.24-43) & 3 (pp46-49) p. 51-64
2	Aug.31- Sept. 4	M W F	4 4 5	Descriptive statistics, Decision making & Linear regression Data integrity, Linear Regression Accuracy, Precision and LOD/LOQ and Corrections	pp. 64-79 pp. 80-89 p. 106-110
3	Sept. 7-11	M W F	18	No Class (Labor Day Holiday) Catch-up, Discussion and Review Spectrometry, Beers Law	p. 433-443
4	Sept. 14-18	M W F	18,19 20 20	Spectrophotometric analysis, Luminescence & Applications Spectrophotometer hardware Errors in spectrophotometry.	p. 444-450, 461-467 p. 491-502 p.508-523
5	Sept. 21-25	M W F	21 21 21	Atomic Spectroscopy, atom cloud formation Temperature effects, line broadening, background correction Detection limits, interferences, inductively coupled plasma Catch-up/review	p. 530-540 p. 487-493 p. 493-498, 502-506
6	Sept.28- Oct.2	M W F	6	Exam 1 Chemical equilibrium review	p. 119-124
7	Oct. 5-9	M W F	6 6,9	Solubility and complexation chemistry, acids, bases Acid-base review	p. 124-126 p. 129-139, 187-196
8	Oct. 12-16	M W F	8 8 9 9	Charge, mass balance Systematic treatment of complex equilibria Buffers Buffers	p. 169-170, 170-172 p. 172-182 p. 196-207 p. 196-207
9	Oct. 19-23	M W F	10 10 14	Diprotic acids Diprotic buffers, polyprotic systems Basics of Electrochemistry	p. 211-219 p. 219-225 p. TBA
10	Oct. 26-30	M W F	15	Basics of Electrochemistry and pH Exam 2 (covers Ch's 6,8,9,10) Two phase extraction & Overview	p. TBA
11	Nov.2-6	M W F	23 23 23	Chromatographic overview Differential migration and band broadening Group Exercises	p. 604-614 p. 604-614 p. 615-625
12	Nov. 9-13	M W F	24 24 24	Gas Chromatography: scope, columns, miscellaneous GC Injection and detection GC method development, sample prep	p. 633-645 p. 645-652 p. 655-661
13	Nov. 16-20	M W F	25 25 25	High performance liquid chromatography HPLC injection and detectors HPLC method development	p. 667-685 p. 685-691 p. 691-704
14	Nov. 23-27	M W F	26 26 26	Exam 3 (Ch's 14,15,22,23,24) No Class (Thanksgiving Holiday) No Class (Thanksgiving Holiday) Capillary Electrophoresis Capillary Electrophoresis Scientific ethics/ Review	p. 729-735 p. 735-740 Chapter 0
15	Nov.30- Dec. 4	M W F			
	Dec. 7	M		Final Exam - Monday, Dec. 7th, 8-11 am	