

LECTURES: MWF 1:10 PM Fulmer 150

INSTRUCTOR: Prof. Jeremy Lessmann
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OFFICE HOURS: Tues/Thurs 9:30-10:30 and by appointment.

PREREQUISITE: Chem 106 with a C or better

COURE MATERIALS:

Quantitative Chemical Analysis, Daniel C. Harris, 8th edition or 9th edition-
REQUIRED
On-line access to Sapling Learning Materials for this course – REQUIRED

Harris will be used as a reference text for Chem 222 and chemistry majors should plan on keeping a copy for use as a supplement in Chem 425 and 426.

You can purchase a hard copy of Harris in any of the Bookstores or online (ISBN for the 8th Ed 987-1-4292-1815-3) 9thEd (978-1-4641-3538-5)). Rental of an E-copy of Harris (9th Ed) can be purchased when you sign up for the Sapling material online (You can rent access to the e-copy for up to 2 years at a substantial discount over the cost of a hard copy. This is probably the cheapest option especially for non-chem majors)

LEARNING GOALS: (Chemistry Dept. Outcomes in **()** as given at <https://undergrad.chem.wsu.edu/majoring-in-chemistry/>)

The overall goal of CHEM 220 is to provide students an opportunity to develop an understanding of and demonstrate proficiency in quantitative chemical analysis. This proficiency will be based on development of knowledge in the following concepts of analytical chemistry. At the end of this course students will be able to:

1. Demonstrate proficiency in the technical basis for quantitative analysis, including precision, accuracy, limits of detection, limits of quantification, estimates of uncertainty, error analysis, calibration curves, and other statistical methods. **(2,3)**
2. Explain the different types of analytical methods, and appropriate applications of those methods for specific analytical needs, including differentiation between molecular and atomic spectroscopy. **(2)**
3. Explain solution conditions and resultant solution speciation by showing an understanding and application of solution activities and systematic treatment of equilibria. **(1,2)**
4. Explain and apply the concepts behind chemical separations for species in solution.
5. Demonstrate the applications of solution chemistry concepts to explain analytical methods, including titrations, chromatography, and spectrophotometry. **(2)**

6. Explain the Nernst equation and relate it to electroanalytical methods, including potentiometry and redox titrations. **(2)**
7. Apply Beer's Law in spectrophotometric and AAS analysis, and the limits of Beer's Law. **(2)**
8. Explain and apply the theory of analytical separations. **(1,2)**

Assessment of learning goals is provided for by mapping goals to individual questions on course exams, quizzes and homework assignments.

LECTURE ATTENDANCE: I do not take attendance in lecture but I **STRONGLY ENCOURAGE** you to attend every class, be engaged, take notes, and ask questions. See the last paragraph of this syllabus.

INTERNET: I use Blackboard: <https://learn.wsu.edu/> for many things, including making announcements, sending emails, and posting accompanying material for both lectures and labs. Your NID and password will log you into this site. In addition, we will be using an on-line homework system described in more detail below. This homework system is separate from Blackboard. Additionally, you may access your grades under the Report tab in Blackboard or in the Grades bar on the main page. When checking your grades on the Grades bar, be sure to click on the "Refresh" link to see the most current grades. I will occasionally make contact with you through Blackboard, either in the format of announcements or emails. You are responsible for checking Blackboard and Blackboard email regularly!

GRADING:

HOMEWORK:	200 points (14 total assignments, best 10 counted)
QUIZZES:	100 points (12 total quizzes, best 10 counted)
EXAM 1:	100 points (50 minutes, during normal class period)
EXAM 2:	100 points (50 minutes, during normal class period)
<u>EXAM 3:</u>	<u>100 points (50 minutes, during normal class period)</u>
Final Exam	200 points Cumulative (120 minutes during final exam period)
TOTAL:	800 points

GRADE RANGES:

745: A	705: A-	670: B+	640: B
615: B-	590: C+	560: C	535: C-
510: D+	480: D	Below 480: F	

Quizzes, homework and exams are not curved. The individual grades are added together to yield a total score with the breakdown shown above. Ranges have been provided for conversion to letter grades. They are provided as a guide. These ranges may be lowered at my discretion as means to curve the grading. They will NEVER be raised. The final determination of the grade ranges will only be done at the end of the semester after all the grades are in. To keep track of your progress in the class, the average and standard deviation of the exams will be posted. You should be able to extrapolate your approximate standing in the class by assuming the average to be a C+.

ACADEMIC DIFFICULTY: If you have difficulty understanding the material or if your performance is not up to your expectations, please make an appointment with me. I urge you not to wait until the term is halfway over before you seek assistance.

EXAMS: All exams will be held in Fulmer 150. They are expected to take no more than the normal 50-minute class period. You will need to bring pencils and a calculator for all exams and quizzes—they will not be provided. No notes or books are allowed during exams and quizzes. If you are unable to take a scheduled exam due to a scheduled academic reason, you will be allowed to take the exam at an earlier time, scheduled on a case-specific basis. It is to your benefit to show all of your work on exams and quizzes. If no work is shown, the answer is wrong. No partial credit may be assigned.

The following statement applies to both exams and quizzes: You are expected to provide appropriate units for each numerical answer. All rules for significant figures apply to final answers, but wait until the end of a calculation before rounding your answer to the final form with appropriate significant figures.

QUIZZES: Quizzes will be typically held on Mondays throughout the semester. These will consist of a short answer question/calculation that should take about 5 minutes and is based on the reading/lecture from the previous week. 12 quizzes will be given throughout the semester, scored out of 10 points each. You will be graded out of your top 10 of 12 quizzes, dropping your lowest score, one optional quiz will be given the final week of classes to replace your lowest scoring quiz.

HOMEWORK: Homework is typically assigned most Wednesdays. It is due the next Wednesday at the beginning of class (1:00 PM). You usually have one week for each assignment. The 10 highest scores of the 14 assignments will be used to calculate your grade. It is in your best interest to do all homework assignments.

We will be using an on-line homework system from Sapling Learning. Instructions for setting up your on-line account with Sapling are:

1. Go to <http://www.saplinglearning.com>
2. If you already have a Sapling Learning account, log in, then skip to step 5.
3. If you have a Facebook account, you can use it to quickly create a Sapling Learning account. Click "create account" located under the username box, then click "Login with Facebook". The form will auto-fill with information from your Facebook account (you may need to log into Facebook in the popup window first). Choose a password and fill in the remaining information, accept the site policy agreement, and click "Create my new account". You can then skip to step 5.
4. Otherwise, click "create account" located under the username box. Supply the requested information and click "Create my new account". Check your email (and spam inbox) for a message from Sapling Learning and click on the link provided in that email to confirm your account.
5. Find your course in the expandable list (sorted by subject, term, and instructor) and click the title link.
6. Select your payment options and follow the remaining instructions.

If the online system becomes unavailable, written homework from Harris may be assigned.

CALCULATORS: You are expected to have and be able to use a scientific calculator. Graphing calculators are allowed and encouraged, but not required. The use of any stored

information/programs in a programmable calculator will be considered cheating (see ACADEMIC INTEGRITY section). Tablets, laptop computers, and/or cell phones with calculators are not allowed during exams and quizzes.

ACADEMIC INTEGRITY: Cheating or plagiarism of any form will not be tolerated. Cheating includes, but is not limited to: copying work or allowing your work to be copied; use of unauthorized material at exams, any communication between students during an exam, and actively looking at another student's paper during an exam. All incidences of cheating will be reported to the Office of Student Affairs. The first incidence of cheating will result in a score of zero for that assignment or exam, a second incident of cheating will result in an F for the course and possible dismissal from the University. Definitions and the processes to be used for handling complaints related to academic dishonesty are presented at <http://conduct.wsu.edu/AI>.

STUDENTS WITH DISABILITIES: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist <http://accesscenter.wsu.edu>, or Access.Center@wsu.edu

CLASSROOM SAFETY INFORMATION: Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students to follow the "Alert, Assess, Act," protocol for all types of emergencies and the "Run, Hide, Fight" response for an active shooter incident. Remain ALERT (through direct observation or emergency notification), ASSESS your specific situation, and ACT in the most appropriate way to assure your own safety (and the safety of others if you are able).

Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety, and related topics, please view the FBI's Run, Hide, Fight video and visit the WSU safety portal.

INSTRUCTOR AVAILABILITY: I am available to meet with students face-to-face during my office hours or by appointment and by email and/or phone. With the exception of the times that I teach, unreasonable days/times (such as the weekends or the middle of the night), and some regularly scheduled work-related or personal activities, I'm available to accommodate your schedule. If you need to contact me by email, be reasonable. Do not expect a response regarding a Monday class when your e-mail was sent at 11:33 pm on Sunday. Given the volume of my inbox it could take up to three academic days to respond to your email. If you don't hear from me in this timeframe, send me a respectful reminder. Sometimes you can drop by my office to chat.

MID-TERM GRADES: During the 2011-2012 school year, the Associated Students of Washington State University (ASWSU – your student government) successfully appealed to the WSU Faculty Senate to institute a policy in which instructors are required to submit mid-term grades for all students, not just Freshmen and transfer students. Here's the policy:

88. MIDTERM GRADE SUBMITTAL. Midterm grades will be submitted for students enrolled in undergraduate courses by 5:00 p.m. on the Wednesday of the eighth week of the fall and spring semesters. For courses that are letter graded, midterm grades may reflect the full range of letter grades (A-F) or may use the C or F grade only. The instructor's syllabus will specify which type of midterm grade will be given to assess

progress. For midterm grades, C and F are defined as follows: A C midterm grade is given to any student who is making satisfactory progress. An F midterm grade is given to any student whose progress is not acceptable and who needs to discuss his/her progress with the instructor. The assessment should not be interpreted as a formal grade, but rather as an indication of the student's progress to date. Midterm grades are advisory and do not appear on the student's permanent record, the WSU transcript.

In this class, I will be calculating actual midterm grades based of the work done to that point in the semester without dropping any grades.

CLASS EXPECTATIONS and LECTURE NOTES: Lecture material will be presented in class. Slides or lecture notes will be provided to you on Blackboard a day or so before the relevant lecture. Many slide sets will cover more than one lecture. To obtain additional material from which to study, you should plan to attend class and take notes. On occasion, I will post supplementary materials on Blackboard. It is your responsibility to access these materials before class. I will teach as though you have these materials, so be prepared by accessing, downloading, and/or printing them before class and reading the relevant chapters in Harris. My slides are only outlines of what I will be going over and graphics. They are not complete. But they will provide you a good basis for adding your own notes. If you don't go to class, you will miss material you will need to be successful.

COURSE SCHEULE

Some of the topics in latter weeks may be shrunk or expanded depending on the progress of the course

Week	Monday Date	Harris Chapter*	HW Assigned	HW Due	Quiz	Special Notes
1	1/8/17	0-3	1			
2	1/15/17	4 to 5	2	1	1 (Wed)	No Lecture Monday: MLK Day
3	1/22/17	6	3	2	2	
4	1/29/17	7(1.5)-8(7)	4	3	3	
5	2/5/17	8(7)-9(8)	5	4	4	Exam 1 (Friday)
6	2/12/17	9(8)-10(9)	6	5		
7	2/19/17	10(9)-11(10)	7	6	5	No lecture Monday: Presidents Day
8	2/26/17	12(11), 14(13)	8	7	6	
9	3/5/17	14(13)-15(14)	9	8	7	Exam 2 (Friday)
	3/12/17	SPRING	BREAK			
10	3/19/17	14(13)-16(15)	10	9	8	
11	3/26/17	18(17)	11	10	9	
12	4/2/17	19(18)-20(19)	12	11	10	
13	4/9/17	21(20)-22(21)	13	12	11	Exam 3 (Friday)
14	4/16/17	22(21)-23(22)	14	13	12	
15	4/23/17	24(23)-25(24)		14	Optional Quiz (Wed)	
16	5/4/17	3-5 PM		Fulmer 150		Final Exam

* Chapters Listed are for the 9th Ed of Harris. Numbers in () are for the 8th Ed if they are not the same