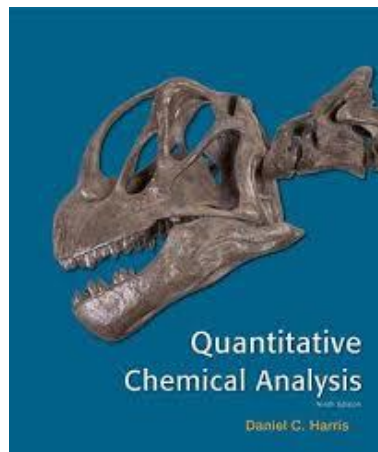


Quantitative Analysis (Analytical Chemistry) Spring 2017

Michael J. Prushan, Ph.D.
Holroyd 331
215.951.1281
e-mail: prushan@lasalle.edu

Office Hours: MW 10:40-11:30; W 1:55-2:45
F 12:50-1:40
and other times by appointment



Text: Daniel C. Harris, *Quantitative Chemical Analysis*, 9th ed.

Course website: Handouts, links, etc. are available on the course website. Follow the links from www.lasalle.edu/~prushan

Chemical analysis has become a part of everyday life in America -- rarely a day passes without an environmental, biochemical or toxicological problem that is defined in terms of chemical composition and measurement. EPA standards, chlorofluorocarbon measurements in the stratosphere, neurological tracers, and nuclear cleanup sites -- all of these politically potent subjects require the use of chemical analysis to help define the issues. In this course we will learn how to apply the concepts of chemical reactivity and equilibrium from General Chemistry in a quantitative fashion to the field of chemical analysis. Through a combination of lectures, laboratories, and problems we will learn how to design and implement a well-defined chemical analysis that conveys the results with full scientific validity.

Course grade

a) *Class Participation (10 %)*: There will be many opportunities for you to participate in class, e.g., by asking questions and solving problems. A portion of your grade will be determined by your ability to regularly and meaningfully contribute to class discussions. Your final grade will be negatively impacted by frequent absences and/or persistent, disruptive talking.

Please note: Cell phones and pagers must be turned off or placed in silent mode at the beginning of class as a courtesy to everyone in the class. Grade penalties of 5-25 points may also be applied for failing to follow this policy.

b) *Quizzes (20 %)*: Short in-class quizzes will be given about once a week. The question format will include short answer and problems. The lowest quiz will be dropped. No make-up quizzes will be available and missed quizzes will count as a zero.

c) *Exams (10 % each)*: Three exams will be given in class. Exam questions will take the form of short answer, and/or problem solving formats. Although homework problems will help you prepare for the exam, it will generally be the case that the exam questions will test what you have LEARNED, by asking you to apply your knowledge. It is therefore important that you UNDERSTAND what you are doing and that you do not just memorize various problem types. There are no make-up exams. Only official documentation confirming legal or medical emergencies will be considered.

d) *Final Exam (15 %)*: A final comprehensive exam, which is about double the number of questions as the in class exams.

e) *Laboratory (30 %)*: Your grade is based on your written lab reports as well as your performance in the laboratory (techniques and accuracy).

*Note: In order to receive a passing grade for Analytical Chemistry you **MUST** pass both the lecture and laboratory portions of the course!*

The actual grade will be based on the grading scale given below:

A 90% B 80% C 70% D 60%

For final grades, The +/- system is used (B+, A-, etc.) and breaks between half letter grades will be within the above grade ranges and made at the discretion of the instructor.

Homework: I expect you to read the assigned sections and homework problems from the textbook. Homework problems are not collected; it is your responsibility to complete your work. It is important that you do your homework. The more you do, the more you will learn. From time to time assignments, which will be submitted, will be handed out. These are meant to check your progress in the course. Chemistry **cannot** be efficiently learned without working problems, and you will not realize what you do not know until you try to do a problem. Most students, who do poorly in this course neglect to do homework! I am happy to help you outside of class. You may consult with me as often as you wish; I encourage it. Please consult early rather than waiting just before a test; it will be better for your learning. In order to compete successfully in this course, you will need to spend at

least 12–15 hours per week studying chemistry. There is ample research which proves that students who study together perform considerably better than those who study alone. You are encouraged to find fellow students interested in spending at least a portion of their study time with others. If you know of no other student taking this course, I will be happy to assist your efforts by making a class announcement for other interested person(s) to meet with you after class. All of us rely on our senses for the learning process. However, the extent to which we rely on sight, sound, even touch and smell differs from person to person. You are encouraged to assess your own learning style preference and capitalize on the approach best suited for you.

Academic Integrity: It is your responsibility to maintain a high degree of integrity in your work. Cheating of any kind will not be tolerated and will result in a failure in the course! The following are considered cheating: (a) Sharing of results and answers on lab reports, graded assignments, quizzes and exams; (b) Use of unauthorized materials during an exam; (c) Plagiarism, including copying a fellow student's lab report or homework.. When in doubt, both parties involved in plagiarism will be held responsible for the integrity violation. Please refer to the school's official Academic Integrity Policy for further information.

Students with disabilities: Students with disabilities should refer to the student handbook for resources that are available to them as well as compliance with the American Disabilities Act. La Salle University also works with students requesting academic accommodations on a case-by-case basis through an interactive process to determine the appropriate accommodations. Students who would like to request academic accommodations must submit the appropriate documentation certifying an illness or condition. To learn more about the process for requesting academic accommodations, please contact Rose Lee Pauline, Affirmative Action Officer, at pauline@lasalle.edu or 215.951.1014.

Syllabus Change Policy: This syllabus is a guide and every attempt is made to provide an accurate overview of the course. However, circumstances and events may make it necessary for the instructor to modify the syllabus during the semester and may depend, in part, on the progress, needs, and experiences of the students. The instructor will give notice when changes to the syllabus are made.

Course Topics Outline:

<u>Week</u>	<u>Chapters</u>	<u>Topics</u>	<u>HW Problems</u>
1	Ch. 0	The Analytical Process	0-1
	Ch. 1	Measurements	1-14, 1-15, 1-16, 1-24, 1-27, 1-31, 1-32, 1-34
2	Ch. 2	Tools of the Trade	2-10, 2-16, 2-23(c)
	Ch. 3	Experimental Error	3-1, 3-2, 3-5, 3-13, 3-15
3	Ch. 4	Statistics	Ex 4-A, 4-B, 4-F, 4-12, 4-22, 4-24
4	Ch. 6	Chemical Equilibrium	Ex 6-G, 6-I, 6-K(a)
	Ch. 7	Let the Titrations Begin	7-1, 7-2, 7-4
5	Ch. 8	Activity and Systematic Equilibrium	Ex 8-A, 8-C, 8-F, 8-G, 8-H, 8-1, 8-4, 8-9, 8-10, 8-11, 8-12, 8-18, 8-23, 8-24
Examination I			
6	Ch. 9	Monoprotic Acid-Base Equilibrium	Ex 9-B, 9-C, 9-D, 9-F, 9-G, 9-5, 9-6, 9-11, 9-12, 9-21, 9-30, 9-32, 9-35, 9-36, 9-38, 9-41
7	Ch. 10	Polyprotic Acid-Base Equilibrium	10-4, 10-5, 10-6, 10-16, 10-27, 10-38, 10-40
	Ch. 11	Acid-Base Titration	11-1, 11-3, 11-4, 11-10, 11-12, 11-17, 11-29
8	Ch. 12	EDTA Titrations	12-1, 12-2, 12-3
Examination II			
9	Ch. 14	Fundamentals of Electrochemistry	Ex 14-B, 14-K, 14-2, 14-3, 14-13, 14-14, 14-17(a-b), 14-21, 14-29, 14-31
10			

<u>Week</u>	<u>Chapters</u>	<u>Topics</u>	<u>HW Problems</u>
11	Ch. 15	Electrodes and Potentiometry	15-6, 15-27, 15-38
12	Ch. 16	Redox Titrations	16-26, 16-30
<i>Examination III</i>			
13	Ch. 17	Electroanalytical Techniques	17-2, 17-38
15	Catch up and REVIEW		
16	<i>Final Examination</i>		