

## Syllabus for Chem 212, Quantitative Analysis Fall Semester 2010

Quantitative Analysis, 3 credit hours; Prerequisite: Chem 106 or 102 and 112 and Chem 222 or Chem 224 and Chem 226 or permission of the instructor.

Instructor: Dr. Paul Chiarelli, Flanner Hall 102, phone 508-3106, E-mail: [mchiare@luc.edu](mailto:mchiare@luc.edu). Office hours Tuesday 1-2:30 PM and Wednesday/Friday 9:30-11 AM, or by appointment.

Textbook: "Exploring Chemical Analysis" (4th edition), by Daniel C. Harris, ISBN 1-4292-1004-4

Other Materials: You will need an inexpensive calculator having logarithmic (base 10 and base e), exponential, and trigonometric functions. Be sure you are familiar with your calculator and that it is in user-ready condition for quizzes and exams. **Calculators cannot be shared during exams and the covers must be removed while taking the exam.**

### Objectives

- 1) To teach fundamental aspects of acid/base chemistry, electrochemistry, and ionic equilibria.
- 2) To acquaint the student with some of the fundamental techniques and state-of-the-art applications of chemical quantitative analysis used in biomedical, forensic, and environmental chemistry.

Grading: The total grade for the course is based on four 1-hour exams given over the course of the semester and one final. The lowest 1-hour exam score will be dropped. If you have to miss an exam due to illness or some other reason, this will be your dropped grade. If you miss another exam, then you must have a valid excuse (doctor's note) to have a make-up exam arranged. Each four hour exam is worth 25% of your grade (best three is 75% of total). The final is worth 25% of your total grade.

Scale: **A** 100-93; **A-** 92-89; **B+** 88-85; **B** 84-81; **B-** 80-77; **C+** 76-73; **C** 72-69; **C-** 68-65; **D** 64-57; **F** <56.

Homework: Students are expected to do the assigned problems in the back of the chapters in the textbook and study the class notes. If you are good about this, you will do well on the exams.

### TENTATIVE CLASS SCHEDULE

<b>Date</b>	<b>Day</b>	<b>Topic</b>	<b>Chapter</b>
Aug 30	Monday	Introduction	3
Sept 1	Wednesday	Stoichiometry Review	3
Sept 3	Friday	Error and Statistics	4
Sept 6	Monday	Labor Day, No Class	
Sept 8	Wednesday	Sampling	4
Sept 10	Friday	Statistics	4
Sept 13	Monday	Stat. Analysis of Data	4
Sept 15	Wednesday	Stat. Analysis of Data	4
Sept 17	Friday	Exam 1 Statistics	3-4
Sept 20	Monday	Acids and Bases	8
Sept 22	Wednesday	Acids and Bases	8
Sept 24	Friday	Acid and Bases	8
Sept 27	Monday	Buffers	9
Sept 29	Wednesday	Titrations	9
Oct 1	Friday	Titrations	10
Oct 4	Monday	Polyprotic acids	10,11
Oct 6	Wednesday	Polyprotic acids	11
Oct 8	Friday	Exam 2	8-11
Oct 11	Monday	Midterm break; no class	
Oct 13	Wednesday	Complex Equilibrium	12
Oct 15	Friday	Complex Equilibrium	12
Oct 18	Monday	Complex Equilibrium and EDTA	12,13
Oct 20	Wednesday	EDTA and Chelation	13

Oct 22	Friday	EDTA and Chelation	13
Oct 25	Monday	Test 3; Ch 12-13	
Oct 27	Wednesday	Electrochemistry	14
Oct 29	Friday	Electrochemistry; Cell Potentials	14
Nov 1	Monday	Electrochemistry; Ref Electrodes	14
Nov 3	Wednesday	Equilibrium Constants	14
Nov 5	Friday	Electrode Measurements	15
Nov 8	Monday	Electrode Measurements	15
Nov 10	Wednesday	Electrode Measurements	15
Nov 12	Friday	Test 4: Ch 14,15	
Nov 15	Monday	The electromagnetic spectrum	18
Nov 17	Wednesday	Absorption spectrometry	18,19
Nov 19	Friday	IR and UV/Vis spec	19
Nov 22	Monday	Luminescence.	19
Nov 24-26	Wednesday– Friday	Thanksgiving Break	19
Nov 26	Friday	Immunoassays	22
Nov 29	Monday	Chromatography	22
Dec 1	Wednesday	Chromatography	22
Dec 3	Friday	Intro to Mass Spectrometry	23
Dec 6	Monday	GC/MS	23
Dec 8	Wednesday	LC/MS	
Dec 10	Friday	Review for Final	
Dec 13	Monday	Final Exam 1:00 – 3:00 PM	LSB 142