Syllabus for Chem 212, Quantitative Analysis
Fall Semester 2012

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. Office hours Tuesday/Thursday 1-2:30 PM and Wednesday 9:30-11 AM, or by appointment.

Textbook: "Exploring Chemical Analysis" (5th edition), by Daniel C. Harris, ISBN 1-4292-7503-3. The Sapling learning online homework system is bundled with the textbook.

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 five 1-hour exams given over the course of the semester, discussions, online homework, 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 of the five hour exams is worth 17 % of your grade (best four is 68% of total). The final is worth 20% of your total grade. Online Homework and Discussion are 6% of your grade each.

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: There will be six online homework assignments due the day of the exam. These assignments consist of 9-10 questions that are typically one-step problems. They will require 60-90 minutes to complete. If you get a question wrong, you can do it again. You are penalized 5% credit each time you have to redo a problem. Therefore if have to redo each question once, you will get a 95 on that assignment. A few of these questions may be multiple choice, in these cases you may lose 20% or 33% credit for a redo depending on how many options there are. Students are expected to do the assigned problems in the back of the chapters in the textbook and study the class notes as well. If you are good about this, you will do well on the exams.

Discussion Sections: Discussion sections meet once a week and will be held on Fridays from 8:15 to 9:05 AM and 9:20 to 10:10 AM in Flanner Hall 105. On most Fridays,

everyone will be expected to complete the problems on the handout provided. The instructor will demonstrate the first problem or a selected problem on the worksheet for the class. Then you will be expected to complete the worksheet problems and hand them in at the end of the session. These will not be graded. If turn in the assignment at the end of the discussion and you have made a good faith attempt to complete the whole problem set , you will get full credit. Discussion sections on Fridays when exams are held will be dedicated to review for the upcoming exam. There will be no formal assignment on those days we have exams.

ACADEMIC INTEGRITY: All students in this course are expected to have read and to abide by the demanding standard of personal honesty, drafted by the College of Arts & Sciences, that can be viewed at:

www.luc.edu/cas/pdfs/CAS_Academic_Integrity_Statement_December_07.pdf

Anything you submit that is incorporated as part of your grade in this course (e.g., quiz, examination, homework, lab report) must represent your own work. Any students caught cheating will, at the very minimum, receive a grade of "zero" for the item that was submitted and this grade cannot be dropped. If the cheating occurred during a course exam, the incident will be reported to the Chemistry Department Chair and the Office of the CAS Dean. Depending on the seriousness of the incident, additional sanctions may be imposed.

TENTATIVE CLASS SCHEDULE

Date	Day	Topic	Chapter
Aug 27	Monday	Introduction	3
Aug 29	Wednesday	Stoichiometry Review	3
Aug 31	Friday	Error and Statistics	4
Sept 3	Monday	Labor Day, No Class	
Sept 5	Wednesday	Sampling	4
Sept 7	Friday	Statistics	4
Sept 10	Monday	Stat. Analysis of Data	4
Sept 12	Wednesday	Stat. Analysis of Data	4
Sept 14	Friday Exam 1 Statistics		3-4
Sept 17	Monday	Acids and Bases	8

Sept 19	Wednesday	Acids and Bases	8
Sept 21	Friday	Acid and Bases	8
Sept 24	Monday	Buffers	9
Sept 26	Wednesday	Acid/Base characteristics of Metals	8,9
Sept 28	Friday	Exam 2 Acids and Bases	8,9
Oct 1	Monday	Polyprotic acids	10,11
Oct 3	Wednesday	Titrations	10,11
Oct 5	Friday	Exam 3 Polyprotic Acids	10,11
Oct 8	Monday	Midterm break; no class	
Oct 10	Wednesday	Chelation	12
Oct 12	Friday	Complex Equilibrium	12,13
Oct 15	Monday	Complex Equilibrium and EDTA	12,13
Oct 17	Wednesday	EDTA	13
Oct 19	Friday	Exam 4; Complex, Equilibria, EDTA	12,13
Oct 22	Monday	Electrochemistry	14
Oct 24	Wednesday	Electrochemistry	14
Oct 26	Friday	Electrochemistry	14
Oct 29	Monday	Reference Electrodes	15
Oct 31	Wednesday	Potentiometry	15
Nov 2	Friday	Test 5	14,15
Nov 5	Monday	Electromagnetic Spectrum	18
Nov 7	Wednesday	Absorption Spectrometry	18
Nov 9	Friday	IR and UV/Vis spec	18
Nov 12	Monday	Emission Spectroscopy	19
Nov 14	Wednesday	Instrumentation	19
Nov 16	Friday	Instrumentation	19

Nov 19	Monday	Quantification by Standard Additions	19
Nov 21, 23	Wednesday– Friday	Thanksgiving Break	
Nov 26	Monday	Immunoassays .	19
Nov 28	Wednesday	Chromatography .	21
Nov 30	Friday	Mass Spectrometry	21
Dec 3	Monday	GC/MS	21
Dec 5	Wednesday	LC/MS	22
Dec 7	Friday	Review for Final	
Dec 10	Monday	Final Exam 1:00 – 3:00 PM	