Syllabus

Course: CH 222 QUANTITATIVE ANALYSIS

Semester: Spring, 2013

Professor: Carl Salter
Collier 228   Phone: 625-7920   email: csalter at chem .moravian .edu

Catalog Description: Theory and application of classical quantitative analysis techniques, including gravimetric, titrimetric, potentiometric, visible spectrophotometric, and liquid-liquid extraction methods as applied to organic and inorganic material. Introduction to statistical treatment of experimental data and development of comprehensive understanding of solution equilibria. Substantial laboratory component provides hands-on experience with each method, applied to the assay of real samples. Prerequisites: Chemistry 114 and 220.2 or permission of instructor. Spring. Two 70-minute periods, two 3-hour laboratories.

Goals:

To encourage the student to develop system and precision in laboratory technique.

To review and expand upon the student's understanding of some of the fundamental properties of matter which are useful in quantitative analysis.

To provide the student with an appreciation of chemistry as an exact science.

To further refine the student's ability to intelligently apply a body of information to the solution of real or hypothetical problems.

Text: Harris, Daniel C.*; Quantitative Chemical Analysis*, 8th edition (Freeman, 2007) ISBN 978-1-4292-5436-6 .

Schedule and Attendance: Lecture meets every Tuesday and Thursday at 10:20 am in CHS 207. Lab meets every Monday and Wednesday afternoon in CHS 209.

Three unexcused absences results in Failure of the course.

Examinations are scheduled to be given on the following dates:

First exam	Tuesday, 12 February
Second exam	Thursday, 21 March
Third exam	Tuesday, 16 April

The ACS Standardized examination will be administered as the final exam on Monday, April 29, 8:30AM.

Note that this exam is timed (100 minutes) and is to be completed closed-book (without the aid of text, notes or other reference).

Evaluation: Your grade will be determined as follows.

Homework problems	10%
Laboratory	50%
Class exams	30%
Final exam	10%

It is within the instructor's purview to apply qualitative judgment in determining grades for an assignment or for the course.

Students who wish to request accommodations in this class for a disability should contact Elaine Mara, assistant director of learning services for academic and disability support at 1307 Main Street, or by calling 610-861-1510. Accommodations cannot be provided until authorization is received from the Academic Support Center.

Lecture Topics:

1. **Solution Conventions and Equilibrium.** Formal, molar, and relative concentration, normal conventions, activity, computational techniques for competitive solution equilibria.

2. **Precipitation Equilibria**. the gravimetric method and precipitation titration.

3. **Acid-base Equilibria**. pH, Buffers, titration of mono- and polyfunctional acids and bases, acid-base indicators.

4. **Complexation Equilibria**. Computations involving polydentate and multiply-coordinate species, aminopolycarboxylic acids, conditional formation constant, complexometric titration.

5. **Redox Equilibria**. Electrochemical cells, the Nernst equation, mixed equilibria, formal potential, redox titration.

6. **Spectroscopy.** Transmittance, absorbance, Beer's law, calibration curve, standard addition.

Lab Experiments:

Jan.	16	Acid Base Titration Practice
	23	Alkalinity of Soda Ash
Feb.	4	Gravimetric Determination of Sulfate
	13	Identification of a Weak Acid
Feb.	25	Mohr Determination of Chloride
March	13	Spectrophotometric Determination of Zn in Cough Drops
	25	Complexometric Determination of Copper
April	8	Determination of Iron in an Ore