

CHEMISTRY 3xx
Analytical Separations and Measurements
Fall 2002

9:00 - 9:50 MWF, FW 201

(A copy of this syllabus is available at the departmental website
<http://www.chembio.niu.edu/syllabi/325fallsyl.html>)

Instructor:
Office:
Phone
e-mail:
Office Hours: MWF 10:00-11:00,
or by appointment

TENTATIVE LECTURE SCHEDULE

WEEK	TOPIC	CHAPTER	EXAM
08/26	Introduction/Measurements/Error	1-3,5	
09/02	Statistics/Sample Preparation (no lecture 9/2)	4,5,28	
09/09	Solubility/Gravimetric Analysis	6,27	Exam I (9/13)
09/16	Activity, Equilibria	8,9	
09/23	Volumetric Analysis/Titrations	7,12,13,16	
09/30	“ ” “ ”	“ ”	Exam II (10/4)
10/07	“ ” “ ”	“ ”	
10/14	Analytical Separations	23	
10/21	“ ” “ ” “ ” “ ”	“ ”	Exam III (10/25)
10/28	Gas and Liquid Chromatography	24,25	
11/04	“ ” “ ” “ ” “ ”	“ ”	
11/11	Mass Spectrometry, GC/MS, LC/MS	22,24,25	
11/18	Chromatographic Methods/Capillary Electrophoresis	26	Exam IV (11/22)
11/25	“ ” “ ” “ ” “ ”	“ ”	
12/02	“ ” “ ” “ ” “ ”	“ ”	

Textbook: Daniel C. Harris "Quantitative Chemical Analysis", 6th ed., Freeman, New York [2002].
On the web: www.whfreeman.com/qca

Quiz/Exam Schedule: All exams are scheduled as indicated above. The final exam is scheduled for Wednesday, December 11 (8:00 - 9:50 AM).

Grading:

Exams (4 @ 100 pts each)	= 300*	(*Note: the lowest hourly exam score will be
Final Exam	= 200	dropped)
Laboratory (see 2nd page)	= 150	
Total	= 650	

Final grades will be based on total points obtained from the 650 possible points. A **tentative** scale is:

580= A	510 = B	440 = C	370 = D	<370 = F
(88%)	(78%)	(67%)	(56%)	

YOU MUST OBTAIN A PASSING GRADE IN LAB (60%) AND TAKE THE FINAL EXAM TO PASS THE COURSE. ALL LAB EXERCISES ARE MANDATORY!

- Supplementary information such as practice exams and exam keys will be posted at <http://webcourses.niu.edu/> You will need your z-ID activated to access the site.
- I would be pleased to discuss any disability-related needs during my office hours.

LABORATORY SCHEDULE

Teaching Assistants: Section A (TuTh 1:00 - 3:50) – Heather Miller and Angelina Chappell
 Section B (MW 6:00 - 8:50) - Amanda Schreckenber

WEEK	EXPERIMENT	PROCEDURE (# in text)	POINTS	DUE DATE (at noon)
08/26	Check-in/ Analytical Balance/ Spreadsheets Tue and Wed only	pp. 25-29, 38-42		
09/02	No Labs Scheduled - Labor Day (9/2) (Literature Report)		10	13 Sept.
09/09	Calibration of Glassware Prep. & Standardization of NaOH Solution	www www	13	20 Sept.
09/16	Grav. Detn. of P in Plant Food	handout	13	27 Sept.
09/23	Chloride by Mohr Method	handout	13	4 Oct.
09/30	EDTA Titration Ca/Mg	www	13	11 Oct.
10/07	Redox Detn. of Ca w KMnO ₄	handout	13	18 Oct.
10/14	Solvent Extraction/Spectrophot.	handout	13	25 Oct.
10/21	Gas Chromatography I	handout	13	1 Nov.
10/28	Gas Chromatography II	handout	13	8 Nov.
11/04	HPLC I	handout	13	15 Nov.
11/11	HPLC II	handout	13	25 Nov.
11/18	Make-ups (Thanksgiving)			
11/25	LC/MS	handout	13	2 Dec.
11/25	Make-ups/Check Out (mandatory)			
		<u>TOTAL</u>	= 150	

Materials:

1. Lab Notebook: Students should purchase a 100-page notebook (carbonless copy); some are available for sale in the Chemistry Stockroom (\$12). Procedures for the experiment are to be summarized in the notebook **before** the scheduled lab period. All data are to be recorded directly in the notebook in ink! Try to maintain an organized and legible notebook (see page 3). Have the TA check your notebook for style and format within the first few lab meetings. The carbon/duplicate sheets will be handed in on a weekly basis for grading; 10 points will be based on accuracy and precision, and 3 points will be based on the notebook (organization/content/style).

2. Safety: Goggles are to be worn in the laboratory at all times! In addition, the workbenches are to be kept clear of clutter (books, backpacks, etc.). Appropriate clothing is to be worn in the laboratory - no sandals or open-toed shoes, no shorts or sleeveless shirts. Long hair should be tied back. **NO FOOD OR DRINKS IN THE LAB!**

LABORATORY NOTEBOOK GUIDELINES

Your lab notebook is intended to be a substantive record of work performed in the laboratory, in which you must record the data/results obtained from your experiments. It should contain sufficient information so that anyone reading your notebook would be able to reproduce your experiments, and evaluate your conclusions. In general, scientific notebooks follow a basic format similar to that provided below.

Suggested Format:

1. Table of Contents - Leave a few pages at the beginning of your notebook so that you can list the individual experiments, the dates on which they were performed, and the pages on which the relevant procedures and data may be found.
2. Experiments - **Each lab exercise should be dated and initialed.** In addition, the following items should be included:
 - a) Title - (see syllabus, page 2) Should be listed both in the Table of Contents and on the first page of the experimental section.
 - b) Objective - A brief (2 to 3 sentences) description of the purpose and goals of the analyses to be performed.
 - c) Procedures - An itemized list of the sequential steps performed, including information relevant to the preparation of samples, standards, and reagent solutions, and the equipment utilized.
 - d) Data - **All data obtained during the analysis should be permanently recorded, in ink, directly in the notebook! Do not write data on pieces of scrap paper!** The data should be clearly labeled (including appropriate units) so that it is obvious what the data represents, i.e. tare weight, weight of tare + sample, etc. If you anticipate accumulating a lot of data, use data tables for convenient data entry. Preparation of these tables ahead of time can save time during the lab. If you make a mistake in entering data, do not erase or obliterate the offending data. Rather, draw a single line through the erroneous value(s) and enter the correct value(s) either above or next to the mistake(s). Include graphs when appropriate.
 - e) Calculations - Your treatment of the data, i.e. calculations and relevant equations, should be included. Your calculations should be clear enough so that it is obvious how the final result was achieved. Estimated error calculations and/or statistical analyses should be included in this section.
 - f) Conclusions - Report your results in appropriate units and with the associated uncertainties. In addition, a brief discussion of the possible sources of error, potential interferences, etc. may be included.