

CHEMISTRY 428
BIOINSTRUMENTAL ANALYSIS
Spring Quarter 2009

Instructor Norman J. Dovichi Office Hours: by appointment
Chem Library, Room 131 dovichi@chem.washington.edu

Lecture MW 11:30 AM - 12:20 PM, Bagley 260

Text Readings from the literature & web. See course web page for links.

Webpage <http://faculty.washington.edu/dovichi/CoursePages/chem428.html>

Lab Manual BAG 271

Lab and Teaching Assistants

<u>Section</u>	<u>Day</u>	<u>Time</u>	<u>TA</u>
AA	T	1:30 - 4:20 PM	Michael Vannatta
AB	W	1:30 - 4:20 PM	Michael Vannatta
AC	Th	1:30 - 4:20 PM	Anna Boardman
AD	F	1:30 - 4:20 PM	Anna Boardman

Course Objectives

- (1) Understand the principles of operation of the major classes of modern chemical instrumentation.
- (2) Use modern chemical instrumentation in a practical setting to analyze real samples.
- (3) Evaluate the performance of an instrument in terms of such figures of merit as limit of detection, linear dynamic range and resolution.
- (4) Compare various measurement approaches for applicability to specific analytical situations.

LECTURE SCHEDULE

Date	Topic
March 30	M Introduction – Validation
April 1	W Statistics
6	M Absorbance & fluorescence
8	W Fluorescence part II
13	M Electrophoresis of DNA
17	F Hybridization arrays & methods
20	M Hybridization, PCR, and real-time PCR
22	W Sanger DNA sequencing & bioinformatics
27	M Sequencing the human genome
29	W Midterm I
May 4	M Electrophoresis of proteins
6	W Liquid chromatography
11	M Mass spectrometry
13	W Mass spectrometry & bioinformatics
18	M Post-translational modifications
20	W Enzymes and enzyme chemistry
25	M Memorial Day – no class
27	W Receptors, inhibitors, & screening
June 1	M Antibody, ELISA, & blotting
3	W Flow cytometry & fluorescence microscopy
10	W Midterm II (2:30-4:20 PM)

Description of Laboratory Experiments

Group 1: DNA analysis April 7-May 1

April 7-10	Start labs 1 & 2 Restriction digest & PCR	BAG 191
April 14-17	Continue labs 1 & 2 DNA Electrophoresis	BAG 191
April 21-24	Lab 3 DNA sequencing lab tour & Groups A and B make SDS-PAGE gel as part of lab 6	Start in BAG 191
April 28 -May 1	Lab 4 Bioinformatics I Use BLAST as database searching tool & Groups C and D make SDS-PAGE gel as part of lab 6	BAG 48

Group 2: Protein analysis May 5-May 29

May 5-8	Labs 5 & 6 ELISA & run, stain, and destain SDS PAGE	BAG 191
May 12-15	Start Lab 7 Tryptic digest	BAG 191
May 19-22	Finish Lab 7 LC/MS for protein identification	BAG 191
May 26-29	Lab 8 Bioinformatics II Use MASCOT or SEQUEST for protein ID	BAG 48

Lab Work

General Information

1. You will not be assigned a desk for this laboratory. Lab work is done at various locations, as listed above. Computers are available for data analysis and report writing.
2. Most of you will be working in pairs. It is desirable that each partner obtains her/his own data. In rare cases, this will be impossible. *However, each person must submit a separate, independent lab report.* Copying or paraphrasing of a partner's report will result in a mark of zero on that lab for both partners.
3. Before leaving the laboratory, you must submit your data to the TA or the instructor for preliminary evaluation and initialization. Make sure that you have properly restored the instrument to its stand-by condition.
4. Please come to the laboratory prepared. Read the manual carefully before performing the experiments. The TA will be happy to answer any questions at the beginning of the lab period.