**The Syllabi**

**Instrumental Analysis**  
Chemistry 362 Spring semester, 2004

Text: "Principles of Instrumental Analysis", 5th Edition,  
Douglas Skoog, F. James Holler and Timothy Nieman

Lecture: MWF 10:00 - 10:50  
Instructor - Stuart Belli, phone x5731, email: belli

Lab: Thursday 1:30 - 5:30  
Instructors - Stuart Belli, Edie Stout

What is Instrumental Analysis?

It’s not just how to use the instruments scattered around the building, although I hope by the end of the semester you will be more comfortable using them, but how the instruments work. However in this class we are going to broaden our horizons to include analytical chemistry.

Goals of the class:

- Learn instrument design.
- Open up the black boxes.
- Develop an understanding of what is happening in there.
- Maybe more important is fostering an attitude that we CAN know what is happening in there.
- Learn experimental design.
- This includes statistics, sampling
- Learn the principles of the phenomena of nature that can be quantified and hence used for analysis.

The laboratory will have two components; short exercises designed to acquaint you with the operation of a specific instrument and longer experiments and/or investigations of much less structure intending to give you practice in adapting, designing, and applying analytical methods to real problems. To avoid wasting your time waiting for instruments and equipment, there will be several experiments running simultaneously which you can rotate through. The exercises will have you collecting data and evaluating the effects of various instrument parameters. You will receive detailed procedures and the write-ups will also be closely scripted. For the investigations we will broaden our attention from the measurement itself to the complete analysis; everything from defining the question to devising a method and evaluating our results. I would like to give as much flexibility on the investigations as possible to allow each of you to explore your interests.

We will also be working with another class, Introduction to Urban Studies, on a project studying lead (Pb) exposure here on Vassar campus. This joint project will be led by Chris Smart and Pinar Batur (Talk about confusing! Can you imagine 3 professors mucking around on one project!) The project requires that you work as part of teams with the Urban Studies students to analyze for Pb exposure.
A new feature this year is our “Chemical Exposure” challenge; you will each be given an item and asked to determine what chemical exposure one would incur through normal use of the item.

Grading:
- Exams (3 plus final) 45%
- Laboratory 45%
- Write-up 45%
- Lab notebook 10%
- Homework 10%
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**Finals**
INTRODUCTION TO URBAN STUDIES:
URBAN SPACE AND STRUGGLE

"The inferno of living is not something that will be; if there is one, it is what is already here, the inferno where we live every day, that we form by being together. There are two ways to escape suffering it. The first is easy for many; accept the inferno and became such a part of it that you can no longer see it. The second is risky and demands vigilance and apprehension: seek and learn to recognize who and what, in the midst of the inferno, are not inferno, then make them endure, give them space." Italo Calvino, Invisible Cities, 1974.

This class is about the "inferno." How have cities come to reflect hierarchy of power in space? Where does the challenge to power come from? The city is a social crucible, and urban space reflects conflict and change. This course will examine the classic arguments and the recent discourse in urban theory, and different disciplinary approaches to urban studies to explore changing urban space both historically and cross culturally, within the context of capitalist economic, political and social relations. Along with the assigned reading, class discussions will include emerging issues in the media and in our community.

Required Texts


Recommended Readings on Reserve
These are recommended readings, that from time to time, I or other instructors in this class will refer to in their lectures. I strongly encourage everybody who is taking this class to take the time to do these readings:


**Course Requirements**

1. **Attendance, attendance, attendance!** More than three unexcused absences will result in reduction of the grade. More than five will result in class failure.

2. **Class participation, class participation, class participation!**
As citizens of the class, we all have responsibility to join the discussions. Failure to participate in class discussions, group projects, or group presentations will affect our class' possibilities of learning and teaching.

3. Three examinations:

   The **first mid-term examination** will be a closed book, in class exam, combining short answer and essay questions. It usually consists of 5 or 6 short answer questions and 2 essays.

   The **second mid-term examination (Observation Report)** will be a challenge to encourage you to see and understand and to interpret the urban conundrum. For your Observation Report, you are expected to choose a location, such as downtown, or Main Street, or the neighboring K-Mart, or perhaps a soup kitchen. You are expected to report on what you see, and by giving examples, demonstrate how your readings and discussions in the class have improved the sharpness of your vision. In your take-home exam, you will be expected to write a theoretical discussion on what you observed. Even though it resembles torture, this exam is meant to be a learning experience. You will be allowed to discuss the
assignment with other students and with me, and you may conduct additional research in the library in support of your essay. It is acceptable to ask for assistance in finding data or reference works, and even editorial advice. But the take-home exam cannot be written in collaboration with another person. In your essay you will be expected to cite sources you use, and to make proper use of references and quotations. The objective is to encourage you to utilize class material to analyze the "urban" in abstract and everyday life.

The comprehensive final examination will be given according to the college final exam schedule. It will consist of 5 or 6 short answer questions, and 2 essay questions.

4. Short Opinion Papers a five page Opinion Paper is due after each section of the class, to tie each section's discussion to the others. The four short Opinion Papers (actually, there are five of them, but one of them will be given as an essay question at mid-term.) will become a guide to disciplinary diversity in Urban Studies.

**Grades**

Grades will be assigned accordingly:
- In class mid-term.....................................................25%
- Take home mid-term (Observation Report)...........20%
- Short opinion papers...............................................20%
- Final exam...............................................................25%
- Class participation...................................................10%

**Course Outline**

January 22.....Introduction.


February 7.....The City and Culture. Required Reading: Readings in Urban Theory, pp. 359-435.
**First Opinion Paper: What is the most urgent question in Urban Theory?**

This is due by February 8\textsuperscript{th} at Sundown, according to The Old Farmer's Almanac.

This Section will be led by Professor Leonard Navarez of Sociology.


February 13.....Guest Speaker- Peter Marcuse.

February 14.....Technocity: Space as a function of Capitalism. Required Reading: Saxenian, Silicon Valley’s New Immigrant Entrepreneuers.


February 21....Second Opinion Paper: What is the "New Spatial Order" of globalizing cities? How does space reveal the contradictions of capitalism? In serving economic needs, how do technocities simultaneously set in motion a contradiction of capitalism?

This is due by the 22\textsuperscript{nd}, no later than the rise of the Moon over the pines, according The Old Farmer's Almanac.

This Section will be led by Professor Tiffany Lightbourn of Psychology and Professor Joy Lei of Education.


March 5......Individual Effects of Desegregation. Required Reading: Eaton, The Other Boston Busing Story, Chapters 4-5.
March 7.......In-class Examination and Third Opinion Paper as one of the Essay Questions: What is segregation? What is your opinion on desegregation policies? How would you respond to counter-arguments to your opinion?

The essay question is due by the 8th, before the cows come home (they do not read The Old Farmer's Almanac).

This Section will be led by Professor Jon Rork of Economics.


March 28....Guest Speaker – Professor Susan Fainstein.

April 2....Housing, Segregation and Spatial Mismatch. Required Reading: O'Connor, Tilly and Bobo, Urban Inequality, chapters 4-5-6.

April 4...Economics of the Labor Market. Required Reading: O'Connor, Tilly and Bobo, Urban Inequality, chapters 7-8-10.

April 9........The Fourth Opinion Paper: Imagine yourself investigating segregation in a major U.S. city. Which variables define segregation patterns best? How would you investigate them?

This paper is due by the 10th, before I leave my office to check if The Old Farmer's Almanac is accurate regarding the sunset.

This Section will be led by Professor Chris Smart of Chemistry and Professor Pinar Batur of Urban Studies and Sociology.

In order to prepare for this section, please read “RACE AND INEQUALITY” (PART II, pages 127-195,) Readings in Urban Theory, Susan Fainstein and Scott Campbell.


April 16......Science and Judgment in Risk Assessment: Toxicity and Lead. Required Reading:


April 23……. JOINT CLASS/ Chemistry Students—PRESENTATION OF LEAD CONTAMINATION FINDINGS.

April 25……..JOINT CLASS/ Urban Studies Students—PRESENTATION OF LEAD CONTAMINATION POLICY DISCUSSION.

April 30……..Prof. Herbert Needleman “Low Level Lead Exposure: Lessons from Public Health,” at 5:00 – Taylor Hall 203.

The Fifth Opinion Paper: What is your urban policy proposal for lead poisoning?

This is due by the 3th, before Jupiter and Saturn descend lower in the western sky at nightfall to lie near the Moon, according to The Old Farmer's Almanac, of course.

May 2…….Discussion and review: How do we search and find our way in urban space?
Supporting Materials

Selected Sources: In addition to assigned reading list for our class, the following is a selection that includes some of the sources that we have found useful in teaching the module on lead poisoning in the urban environment.

Books on the history and epidemiology of lead poisoning:


Additional articles on lead contamination/poisoning as a case study in the college courses:


**Analytical methods related to lead analysis:**


United States Environmental Protection Agency (1996). Method 3050B Acid Digestion of Sediments, Sludges and Soils, Revision 0, December.


**Lead related websites:**

http://www.epa.gov/opptintr/lead/index.html
http://www.epa.gov/lead/403FS01.pdg
http://www.epa.gov/opptintr/lead/leadhaz.htm
http://www.epa.gov/grtlakes/seahome/leadenv/src/foodad.htm
http://www.health.state.ny.us/nysdoh/environ/lead.htm
http://www.health.state.ny.us/nysdoh/environ/leadq.htm
http://www.cdc.gov/nceh/lead/lead.htm
http://www.nsc.org/library/facts/lead.htm
http://www.leadsafe.org/
http://www.haz-map.com/leadfact.htm
http://www.hud.gov/offices/lead/index.cfm
Instrumental analysis is a field of analytical chemistry that investigates analytes using scientific instruments. Spectroscopy measures the interaction of the molecules with electromagnetic radiation. Spectroscopy consists of many different applications such as atomic absorption spectroscopy, atomic emission spectroscopy, ultraviolet-visible spectroscopy, x-ray fluorescence spectroscopy, infrared spectroscopy, Raman spectroscopy, nuclear magnetic resonance spectroscopy, photoemission spectroscopy.