Analytical Methods in Urban Environmental Pollution
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Spring 2015

Instructors: Dr. Ashaki Rouff; ashaki.rouff@ rutgers.edu; 973 353 2511
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Lecture: Monday 6-9 pm
Location: 127 Smith Hall
Office hours: Open door policy
Prerequisites: Two semesters undergraduate General Chemistry

Course description

- This course focuses on the principles and application of modern instrumental methods to evaluate environmental samples of contemporary relevance. The course is structured for students with varied research backgrounds and goals so that they may apply both specific tools (where applicable) and more generally the concepts towards their own graduate-level research. The importance of experimental error, standards, statistics, and quality assurance will be emphasized. Specific analytical methods to be discussed and/or implemented in lab exercises include spectroscopy (UV-vis and flame/graphite furnace atomic absorption), SEM, XRD, FTIR and kinetics of environmentally relevant reactions.
- Most of the time in the course will involve student participation in group-based, hands-on lab research involving sample collection, processing, and analysis, culminating in a written report and oral presentation.

Learning Objectives:

- Develop both the analytical toolsets and mindset for quantitative research.
- Achieve a clear understanding of statistically rigorous analyses that yield quantitative and statistically defendable data.
- Through hands on analysis of environmental samples, apply analytically disparate techniques to answer environmentally significant questions.

Study Materials:

1. *Exploring Chemical Analysis*, Daniel C. Harris, Freeman and Company, 5th Edition. ISBN-13: 978-1-4292-7503-3
2. Lecture notes (pdf files of lecture slides will be provided)
3. Handouts

Homework, Exams and Grading:

There will be a total of 7 lab reports to be submitted during the course. The course will culminate with a synthesis report, to be handed in by each student, and a presentation. Due to the hands on nature of the course, attendance is critical to satisfactory performance. Many of the lab exercises will be done in groups, but reports will be handed in individually. Occasionally groups may need to schedule follow-up analyses as necessary. The final grade will be calculated according to the following breakdown:

Lab reports 50% (report weights vary per assignment)
MidTerm 20%
Synthesis 20%
Presentation 10%

Grading Formula: Specific grades are as follows: ≥ 90.0 % = A; 89.9–80.0 % = B; 79.9-70.0 % = C.

Class Schedule (see attached)

*Note that the schedule may be subject to change; you will be informed of any changes

Date	**Topic**	**Assignment due**	**Instructor**
26-Jan	**CANCELLED DUE TO SNOW**		
2-Feb	**CANCELLED DUE TO SNOW**		
9-Feb	Experimental error		Rouff
16-Feb	Calibration using UV-Vis	Lab Report 1	Elzinga
23-Feb	Calibration using UV-Vis		Elzinga
2-Mar	AA standards preparation	Lab Report 2	Rouff
9-Mar	AA analysis		Rouff
16-Mar	**SPRING BREAK**		
23-Mar	**MID TERM EXAM**	Lab Report 3	
30-Mar	AA standard addition		Rouff
6-Apr	FTIR analysis	Lab Report 4	Rouff
13-Apr	XRD analysis	Lab Report 5	Elzinga
20-Apr	Analysis of unknowns	Lab Report 6	Rouff
27-Apr	Analysis of unknowns		Elzinga
4-May	Presentations	Synthesis Report	Rouff/Elzinga