Water Quality Control Laboratory, ENVR 602 001 Syllabus

School of Environmental Science, Engineering and Policy, Drexel University, Philadelphia, PA

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Room: 508 Nesbitt. **Time:** Tuesdays, beginning at 4:00 p.m., ending between 7:00 and 10:00 p.m.

Prerequisites: Chemistry of the Environment, ENVR 501

Text book (Optional, a copy will be available in the lab): ***Chemistry for Environmental Engineers*** by Sawyer, McCarty and Parkin (formerly a Drexel professor), McGraw Hill, 1994.

Other materials: Chapters from ***Standard Methods*** and copies of journal articles and "cookbook recipes" will be provided. Samples will be obtained from local streams and wells, swimming pools, tap water and from the Southwest Sewage Treatment Plant.

Objectives: To obtain hands-on experience with water quality analytical chemistry methods, to gain an appreciation of the capabilities and limitations of various analytical methods and equipment, and to learn that reported and published analytical data have systematic and random errors, which must be considered when interpreting the data.

General philosophy and approach: We will run a variety of analyses on water and wastewater samples. Students will work in teams. Some analyses will use traditional wet chemistry methods, others will use instrumentation. There will be a short lecture some weeks, but most of the time will be spent doing hands-on work.

Each team will present a **special project demonstration** in week l0. This will include an oral presentation of the topic and description of the technology being presented and a physical presentation of the technique(s).

We will attempt to wrap up each topic before leaving each week, including lab reports. Sometimes things will not go as planned (it is the nature of lab work), and we will finish whatever is left the following week. Reports are two-page maximum and include:

1. Description of the analyses.
2. Results and observations.
3. Answers to questions asked during class.
4. Statement of relevance of the analyses, how it may be applied, and its limitations.

Grades: 1/3 lab reports, 1/3 class participation, 1/3 special project.

Schedule and Topics Covered:

Week l (March 27): pH, alkalinity, acidity, the carbonate system

Week 2 (April 3): Chloride, free and combined chlorine

Week 3 (April 10): Solids, sulfate, color, turbidity, conductivity

Week 4 (April 17): Dissolved oxygen, BOD

Week 5 (April 24): Guest lecturer Dr. Jacob Gibs, USGS, water quality data management and quality assurance.

Week 6 (May 1): Iron, prepare THM formation potential samples

Week 7 (May 8): Gas chromatography and chromatography theory (field trip to U. S. Geological Survey, W. Trenton, N.J.)

Week 8 (May 15): Nitrogen (nitrate, ammonia, Kjeldahl Nitrogen)

Week 9 (May 22): work on student demonstrations

Weeks 10 (May 29): student demonstrations

Possible special project demonstration topics:

- Specific ion electrode analysis
- Activated carbon adsorption
- Flocculation jar testing .
- Corrosion and deposition indices
- Total viable microorganism counting
- Air sampling and analysis for volatile organics

Prepared by Ronald J. Baker, April 20, 2001