

CEE 697z - Organic Compounds in Water and Wastewater

Fall Semester 2014

MF 11:15; W 8:00

Catalog Description

This 3-credit course is primarily concerned with both natural and anthropogenic organic compounds in water. It will cover information on occurrence, origin, transformations, modeling, and impacts on human and ecological health. The compounds covered in this course will include:

- Naturally-occurring compounds such as humic substances, plant biomolecules, extracellular organic matter
- Industrial & personal products: solvents, pharmaceuticals, flame retardants, fluoropolymers, PCBs
- Agricultural products: pesticides, herbicides
- Unintended byproducts of human activity: disinfection byproducts, combustion byproducts

We will look at how they behave in the environment as well as in water and wastewater treatment systems. We will also explore how some may impact the global carbon balance. Prerequisites: Knowledge of conventional water quality parameters. CEE 370 or equivalent, General chemistry. Surface water quality modeling is useful but not essential.

**Required
Text:** none

References: Schwarzenbach, Gschwend & Imboden, Environmental Organic Chemistry, 2nd Edition, Wiley, 2002
Reemtsma & Jekel, Organic Pollutants in the Water Cycle, Wiley, 2006.
Steinberg, Ecology of Humic Substances in Freshwaters, Springer, 2003

Instructor: David A. Reckhow, Professor of CEE
300 Elab II or 16c Marston, reckhow@ecs.umass.edu
Office Hours: MWF 10:00 to 11:00; F 1:30-3:30

Goals:

1. To provide a fundamental understanding of the types, structure, and properties of organic compounds found in natural waters, drinking waters and wastewaters
2. To provide the students with some direct exposure to models currently used in environmental engineering practice for predicting the behavior of these organic compounds in natural and engineered systems.
3. To instruct as to how water organic quality data can be analyzed and interpreted

4. To acquaint the student with current issues in organic contamination of water; and to make them aware of the technical, political, ethical and sociological components of these issues.

Tentative Schedule

Week of:	Topic
Sept 1	Introduction & Planning
Sept 8	Natural Organic Matter
Sept 15	
Sept 22	
Sept 29	
Oct 6	Fracking Fluids & Oil Surfactants
Oct 13	PPCPs & Estrogenic Compounds
Oct 20	
Oct 27	
Nov 3	
Nov 10	Cyanotoxins
Nov 17	
Nov 24	Hydrophobic Toxins
Dec 1	

Grading

Class participation	10%
Semester project (Lecture and written report)	60%
Final exam (take-home; 24 hr)	30%

CEE 697z Website:

<http://www.ecs.umass.edu/cee/reckhow/courses/Org/>