University of Manitoba, Department of Geography and Environment
GEOG 7010 Environmental Organic Chemistry
Course Outline, Fall Term 2018

Instructor: Dr. Charles S. Wong, University of Winnipeg 2RC022, 786-9335, fax 775-2114, wong.charles.shiu@alum.mit.edu
Lectures: 3 hours/week as arranged; location as arranged.
Office hours: by appointment. If you drop by, I will help you if I'm not busy.
Prerequisites: 1 year organic chemistry, 1 term thermodynamics, or permission of instructor.

Course description: This course provides a comprehensive examination of processes affecting organic compounds in the environment, particularly anthropogenic pollutants, with an emphasis on characterization of current literature and issues in this area. Physical-chemical properties are used to predict chemical transfers among environmental compartments (e.g., air, water, sediments, biota). Molecular structure-activity relations are used to estimate chemical, photochemical, and biochemical transformation rates. Resulting process models are combined to predict environmental concentrations and related biological exposures of organic compounds.

Course materials:

- Textbook: Schwarzenbach RP, Gschwend PM, Imboden DM (2017) *Environmental Organic Chemistry, 3rd edition*, Wiley.
- Lecture notes, additional readings and handouts, and assignments: These will be handed out in class and/or available electronically.

Grading:

- Assignments: 20%
- Journal club presentation and participation: 20%
- Take home midterm exam: 20%
- Final exam: 40%

Topics to be covered and textbook readings (some variation may be possible)**:**

Introduction (Chap. 1-3, 5)
Background thermodynamics (Chap. 4)
Vapor pressure (Chap. 8)
Phase transfer processes (Chap. 7)
Aqueous solubility and estimation (Chap. 9)
Air-water partitioning (Chap. 9)
Advective and diffusive mass transport (Chap. 17-19)
Octanol-air and -water partitioning (Chap. 10)
Sorption (Chap. 11-15)
Bioaccumulation (Chap. 10)
Air-water partitioning (Chap. 6, 20)
Reactions: kinetics (Chap. 21)
Reactions: hydrolysis and nucleophilic substitutions (Chap. 22)
Reactions: redox (Chap. 23)
Photochemical reactions (Chap. 24-25)
Biotransformation (Chap. 26)
Fate modeling (Chap. 6, 28)

Academic Integrity: It is your responsibility to acquaint yourself with the University Policy on plagiarism, cheating, and examinations. The copying of another student's assignment or the submission of the same material for two or more courses is plagiarism. Plagiarism and any other form of cheating in examinations, labs, or term tests are subject to serious academic penalty. The full definition of plagiarism and the possible penalties associated with it can be found in the Calendar. Proper citation must be given to outside sources of information and material.