

**Graduate-level Course EOH 2122  
Spring Term 08-09**

**Transport and Fate of Environmental Agents – Syllabus**

**Instructor:** Conrad (Dan) Volz, DrPH, MPH, Assistant Professor. This **3-credit** course is intended for public health students who may have taken few college-level chemistry and perhaps no physics classes. Pre-requisite: EOH 2121, or equivalent (*e.g.* EOH 2309) as determined by the instructor.

**Textbook:** Chemical Fate and Transport in the Environment by H.F. Hemond & E.J. Fechner-Levy, Academic Press, 2<sup>nd</sup> Ed. (2000).

**Schedule:** 2 classes per week from 5pm to 6:20pm on Mondays and Wednesdays, Room A216 PH

**Instructors Office Hours:** By Appointment 724-316-5408 or [cdv5@pitt.edu](mailto:cdv5@pitt.edu)

**Instructors Office and Websites:**

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- Assistant Professor, Environmental and Occupational Health, University of Pittsburgh, Graduate School of Public Health <http://www.pitt.edu/~cdv5/>
- Director-Center for Healthy Environments and Communities <http://www.chec.pitt.edu>
- Director, Environmental Health Risk Assessment Certificate Program <http://www.publichealth.pitt.edu/interior.php?pageID=82>

**Description:** This course presents in a quantitative fashion the passage, transformation and eventual fate of various biological, chemical and physical agents through the environment, home and occupational settings. Included are consideration of atmospheric transport, surface and groundwater sediments, indoor transport and ventilation, chemical degradation, bioaccumulation and movement through food chains. The material is presented in an intuitive fashion rather than within a rigorously mathematical framework. This approach is intended to address students who may simply require a basic literacy in environmental transport and fate processes in addition to those who will ultimately be pursuing a degree in environmental science.

**Objectives:** The goal is to teach students from diverse backgrounds both to not only understand relevant concepts, but also be able to work quantitative problems, employing practical numerical models, dealing with the transport and fate of environmental agents.

**Grades:** Based on class participation and homework problems (30%), a midterm and final examination (each 30%).

**Content:** The following topics will be covered in the lectures and the material will be reinforced by assigning weekly sets of homework problems.

- Week 1:       1. Introduction – advection, dispersion, transformation.  
                  2. Free energy and chemical equilibria.
- Week 2:       3. Chemical kinetics versus equilibria.  
                  4. Distribution between phases.
- Week 3:       5. Physical transport in surface waters.  
                  6. Air-water exchange.
- Week 4:       7. Characteristics of surface waters.  
                  8. Abiotic chemical transformations.
- Week 5:       9. Dissolved Oxygen and Introduction to Biotransformation  
                  10. Biotransformation and Biodegradation including Bioconcentration
- Week 6       Catch-up on Problems and Research Lectures- Hg, Se and As in Three  
                  Rivers Fish and Estrogenicity  
                  of Channel Catfish in Relationship to Sewage Overflows
- Week 7       Review for Midterm Exam and the Midterm Exam
- Week 8       Physics of groundwater movement
- Week 9       Flow in the Unsaturated Zone, Flow of Nonaqueous Phase Liquids
- Week 10      Retardation and Biodegradation
- Week 11      The Atmosphere, Stability and Circulation
- Week 12      Transport and Removal of Agents in the Atmosphere
- Week 13      Atmospheric Reactions and Global Climate Change
- Week 14      Approaches to modeling the atmosphere
- Week 15      Review and Final Examination

**Academic Integrity:** All Students are expected to comply with the University of Pittsburgh's Policy on Academic Integrity. <<http://www.pitt.edu/~graduate/ai1.html>> Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an examination, including dictionaries and programmable calculators.

**Disabilities:** If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and the Disability Resources and Services <<http://www.drs.pitt.edu/>>