SYLLABUS
11:375:423/523 – ENVIRONMENTAL FATE & TRANSPORT
Time: Monday and Thursday, 9:15-10:35
Location: Ruth Adams Bldg. Rm 206

Instructors: *Robert Miskewitz (Course Supervisor), Daniel Gimenez*

Office Location: *ENR 334 (Cook) and Weeks 328A (Busch)*
Office Hours: *By appt.*
Text: Assigned reading will be distributed throughout the semester

Description: *The fate and transport of chemicals to determine chemical exposures in aquatic systems and predict future conditions. Emphasis on water quality problems introduced by addition of nutrients, metals, and toxic organic chemicals to water, soil, and air.*

Prerequisites: Calculus II (640:136 or 640: 152), Physical Principles of Environmental Sciences (375:203)

Grading:

Homework	15%
Student Projects	30%
In Class Quizzes (2)	30%
End Term Exam	25%

Homework policy:

Homework will be assigned on Monday and is due at the beginning of class the following Monday. Late homework will be discounted 15% for each day it is late. You are encouraged to help each other learn the material, BUT THE HOMEWORK YOU TURN IN MUST BE YOUR OWN WORK. Please write computer programs and/or use spreadsheets to do your OWN homework, but you must document your work completely including sample calculations. There is no reason why two persons should submit the same spreadsheet. Homework will not be assigned every week. Student Project will include a semester-long modeling project that will be updated as the semester progresses. Groups will be assigned at the beginning of the semester and stay the same until the end.

Class Schedule:

1. Introduction to Environmental Models
2. Control Volumes, Mass Balances, Numerical Solutions
3. Reaction Kinetics
4. Chemical Equilibria/Partitioning
5. Environmental Transport Phenomena,
6. Air-Water Exchange
7. River Transport, Lakes and Wetlands and Estuaries
8. Natural Water Chemistry, Ecosystem Characteristics and Redox Chemistry
9. Sediment Transport, Bottom Sediments
10. Eutrophication: Causes, Limiting Nutrients, Models
11. BOD/DO Modeling and Microbial Kinetics
12. Conventional Pollutants in Rivers
13. Groundwater and Aquifers, Darcy's Law, and Flow Nets
14. Groundwater Pollution Hydraulics and Transport
15. Groundwater Reactions and Sorption
16. Unsaturated Zone Flow
17. Unsaturated Zone Contaminant Transport
18. Analysis of Risk

Please note that this schedule is preliminary, and may change due to the pace of the class, weather, etc.