

PRINCIPLES OF ENVIRONMENTAL MODELING

CIVE 6378 (Section#01580)

Room – SEC205

5:30 p.m. – 7:00 p.m. on Mondays and Wednesdays

Professor: Dr. Shankar Chellam – Room N-113 Building D.
Tel. 713-743-4265, Fax: 713-743-4260, E-mail: chellam@uh.edu.

Course objective: Introduce students to techniques of developing and solving mathematical models for chemical transport and transformations in the environment with emphasis on aqueous processes.

Textbook: Lawler, D.F. and Benjamin, M.M. *Water: Physical-Chemical Treatment Processes (in preparation)*

Office Hours: Tue. and Thu.: 1:00 – 4:00 p.m. and Fri. by appointment.
I will have an open-door policy. However, I prefer that you make appointments.

Teaching Assistant: Pranav Kulkarni (pkulkarni@uh.edu), Room E-116-D3. However, you should also feel free to approach me for assistance as necessary.

Reference Materials:

1. Schnoor, Jerald L. *Environmental Modeling – Fate and Transport of Pollutants in Water, Air, and Soil*, John Wiley & Sons, 1996. Chapters 2, 3, 4, and 6 of the text will be discussed in detail.
2. Stumm, W. and Morgan, J.J. *Aquatic Chemistry*, 3rd Edition, John Wiley & Sons, 1996.
3. Logan, Bruce E. *Environmental Transport Processes*, John Wiley & Sons, 1999.
4. Clark, Mark M. *Transport Modeling for Environmental Engineers and Scientists*, John Wiley & Sons, 1996.
5. Snoeyink and Jenkins. *Water Chemistry*, John Wiley.
6. Some pertinent scientific journals include: *Environmental Science and Technology*, *Ground Water*, *Journal of Environmental Engineering*, *Water Research*, *Water Resources Research*, *Applied and Environmental Microbiology*, *Journal of Contaminant Hydrology*, etc.

Grading:	Five spot quizzes	25%
	Exam 1	15%
	Exam 2	20%
	Final exam	25%
	Homework assignments	15%

Six short (15 – 20 minutes duration) quizzes will be given, but only five will be counted towards your final grade. The final exam will be comprehensive and will be held on Friday, Dec. 9th from 5 p.m. – 8 p.m. Exams and quizzes may not be made up. Students with adequate documented reason(s) (e.g. a car accident) for missing one exam may take the final exam at the appropriate increased weight (40% or 45%).

Homework Assignments:

1. Simple integral mass balances
2. Exit age distribution(s)
3. Exit age distribution(s) and finite difference approximations
4. Ideal reactors and Laplace transforms
5. Non-ideal reactors
6. Chemical kinetics
7. Solutions to systems of ordinary differential equations (time permitting)

I expect serious effort from each student to turn in a clean, well-written copy of the homework. You can (and should) work together, but please do not copy. Unless otherwise specified, you will have one week to complete every homework assignment. They will be due to me at the start of each class. Assignments not turned in on time will not receive any credit whatsoever. Class participation is an essential component of graduate education and will be considered for borderline grades.

Prerequisites: Calculus through differential equations, proficiency in any spreadsheet software program such as Microsoft Excel, knowledge of a programming language such as FORTRAN, C, or visual basic. CIVE 6377 Environmental chemistry will be a co-requisite.

Note: It is not permitted to use a cell phone during my class unless you obtain my permission beforehand.

Students with special needs should contact the Student Service Center, Room 307 (743-5400).