[A-3]COURSE SYLLABUS

1. Course Description (Approximately 100 words)

This class serves as an introduction to mass transport in environmental flows, with emphasis given to river and lake systems. The class will cover the derivation and solutions to the differential form of mass conservation equations. Class topics to be covered will include: molecular and turbulent diffusion, boundary layers, dissolution, bed-water exchange, air-water exchange and particle transport. The first part of the course introduces the process system approach. The second part deals with the application of certain key principles of engineering and science that are required for any quantitative treatment of environmental problems.

2. Course Goals and Objectives (Approximately 100 words)

On successful completion of this course students will be able to:

1 Understand the basic concepts of Kinetics and rate of reactions;
2 Understand the basic concepts of Reactor Models & Ideal Reactors;
3 Understand basic calculations in Water Chemistry;
4 Understand the concepts of Fate & Effects of Pollutants;
5 Understand the basic concepts of Plume Dispersion;
6 Understand the basic concepts of Air Pollution;
7 Understand the basic concepts of Greenhouse Effects and
8 Understand Radiation and Uranium Mining.

3. Textbook (Title, Author, Publisher, Year of Publication, etc.)

Fogler, H. S., “Elements of Chemical Reaction Engineering”, Prentice-Hall, 1986

Masters, G.M. Introduction to Environmental Engineering and Science, 2nd Edition, Prentice-Hall, 1998.

4. Reference

Fischer, Hugo, John List, C. Robert Koh, Jorg Imberger, and Norman Brooks. Mixing in Inland and Coastal Waters. San Diego, CA: Academic Press, 1979. ISBN: 9780122581502.

5. Course Requirements and Grades

EXAMINATION = 70%
ASSIGNMENT = 10%
C.A.T. = 20%

6. Course Calendar

Week	Main Content
1	Conceptual Model of Diffusion
2	Conservation of Mass
3	Diffusion of an Instantaneous, Point Release
4	Boundary Conditions
5	Advection and diffusion of an instantaneous release
6	Continuous point sources
7	C.A.T.
8	Continuous point sources CONTINUED
9	Velocity profiles and turbulence
10	Velocity profiles and turbulence CONTINUED
11	Dispersion processes
12	Reaction and interfacial exchange
13	Transport of particles
14	EXAMINATION