

**CIEG 430 / 630 Water Quality Modeling (3 credits)
Spring 2006**

Class	Thursday 6-8:30 PM
Location	ITV Rooms: Robinson Hall and Canon
Instructor	Dr. Dominic M. Di Toro
Office Hours	Thursday 2-5 PM or by appointment DuPont 356
Email	dditoro@ce.udel.edu
Required Text	Chapra, S. C. (1997). <u>Surface Water-Quality Modeling</u> . New York, McGraw-Hill.

Course Requirements

Grading will be based on two take home open book exams (25 pts each), each covering one-half of the course material and homework (50 pts). Homework will be assigned on a weekly basis and are due one week later. They will be graded, and must be handed in on time at the beginning of class. Failure to do so will result in a deduction for each late homework. Assignments must be done neatly using Excel as explained in class or they will not be accepted. Grade Scale: A (100-90); A- (89-85); B+ (84-80); B (79-75); B- (74-70); C+ (69-65); C (64-60); F (<59)

Course Lectures

Class will meet from 6 PM to 8:30 PM. Two lectures will be given each day

Course Schedule

The classes will follow the textbook, with the following sections from the textbook being covered.

SURFACE WATER QUALITY MODELING			
LECTURE	Date		
			PART I: COMPLETELY-MIXED SYSTEMS.
1	9-Feb-05		1 Introduction.
2	16-Feb-05		2 Reaction Kinetics.
	16-Feb-05		3 Mass Balance, Steady-State Solution and Response Time.
3	23-Feb-05		4 Particular Solutions.
	23-Feb-05		5 Feedforward Systems of Reactors.
			PART VII: TOXIC SUBSTANCES.
4	2-Mar-05		40 Introduction to Toxic Substance Modeling.

	2-Mar-05		41 Mass-transfer Mechanisms: Sorption and Volatilization.
5	9-Mar-05		43 Radionuclides and Metals.
			PART II: INCOMPLETELY-MIXED SYSTEMS.
6	16-Mar-05		8 Diffusion.
	16-Mar-05		9 Distributed Solutions (Steady-state).
7	23-Mar-05		10 Distributed Solutions (Time Variable).
	23-Mar-05		11 Control-Volume Approach: Steady-state Solutions.
	23-Mar-05		12 Simple Time-variable Solutions.
	23-Mar-05		MID-TERM EXAM
	6-Apr-05		Examination deadline
			PART IV: DISSOLVED OXYGEN AND BACTERIA
8	6-Apr-05		19 BOD and Oxygen Saturation.
	6-Apr-05		20 Gas Transfer and Oxygen Reaeration.
9	13-Apr-05		21 Streeter-Phelps: Point Sources.
	13-Apr-05		22 Streeter-Phelps: Distributed Sources.
10	20-Apr-05		23 Nitrogen.
	20-Apr-05		24 Photosynthesis/Respiration.
11	27-Apr-05		25 Sediment Oxygen Demand.
	27-Apr-05		26 Computer Methods.
	27-Apr-05		27 Pathogens.
			PART V: EUTROPHICATION AND TEMPERATURE
12	4-May-05		28 The Eutrophication Problem and Nutrients.
	4-May-05		29 Phosphorus Loading Concept.
			PART VI: CHEMISTRY
13	11-May-05		37 Equilibrium Chemistry.
	11-May-05		38 Coupling Equilibrium. Chemistry and Mass Balance.
	11-May-05		39 pH Modeling.
	11-May-05		FINAL EXAM
	25-May-05		Examination deadline