



## **Surface Water Hydraulics and Quality Modeling (CIV G261) – Spring 2005 Syllabus**

**Catalog Description:** Examines mechanisms through which environmental water quality becomes degraded, control strategies for mitigating degradation, and resource management strategies for preventing degradation. Topics include contaminant sources, eutrophication processes, environmental transport and transformation processes, water quality measurements and monitoring, contaminant fate and transport modeling in lakes, rivers, estuaries, and ground water, water quality control methods and strategies, and water resource protection regulations and strategies.

**Prerequisite(s):** Environmental Chemistry (CIV G250) and Hydrology (CIV G260)

**Expected computer skills:** word processing and spreadsheets (including graphics), Internet use (including file downloads)

### **Text and Other Required Materials:**

#### Required Text(s)

*Surface Water-Quality Modeling* by Steven C. Chapra, **1997**, McGraw-Hill, Boston.

#### Other Text(s)

*Principles of Surface Water Quality Modeling and Control* by Robert V. Thomann and John A. Mueller, **1987**, HarperCollins, New York.

*Environmental Modeling* by Jerry L. Schnoor, **1996**, John Wiley, New York.

#### Internet Download(s)

*Delaware Estuary PCB TMDL – Model Calibration Report* by Delaware River Basin Commission (DRBC), **2003**, West Trenton, Pennsylvania.

[www.epa.gov/reg3wapd/tmdl/pdf/delaware\\_tmdl/ModelCalibrationReport.pdf](http://www.epa.gov/reg3wapd/tmdl/pdf/delaware_tmdl/ModelCalibrationReport.pdf)

*Better Assessment Science Integrating Point & Nonpoint Sources (BASINS)* by Environmental Protection Agency (EPA), **2004**, Washington, D.C. [www.epa.gov/ost/basins/](http://www.epa.gov/ost/basins/)

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**Office hours:** MW 4:00 – 6:00 pm or by appointment

**Teaching Assistant(s):** Petr Masopust; 378 Columbus Place;  
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**Course Schedule:** MW 6:00 – 7:40 pm, 31 SL (Snell Library)



**Course Web Page:** blackboard.neu.edu. Note that announcements (e.g. homework assignments) will be made in class and maybe made on Blackboard.

### Course Objectives:

1. To enable students to perform analysis and design in the topics listed below.
2. To familiarize students with important data sources and references in the field.
3. To help students think critically about contemporary issues in the field.

### Course Topics:

No.	Description	Reading*
1	Introduction	1-3
2	Inputs	Handout
3	Transport in Lakes	3-7, 16
4	Transport in Rivers	8-12, 14
5	Transport in Estuaries	15
6	Transport in Sediments	17
7	Dissolved Oxygen	19-26
8	Pathogens	27
9	Eutrophication	28-29, 32-36
10	Toxics	40-45
11	BASINS Model	EPA (2004)
12	Delaware Estuary PCB TMDL – Case Study	DRBC (2003)

\*Numbers refer to lecture numbers in Chapra (1997) text.

**New England Water Environment Association (NEWEA) – Annual Conference.** You are required to attend the NEWEA conference held at the Marriott Copley Place Hotel January 23-26 and participate in either a technical session or facility tour related to surface water quality. The “Cottage Farm and Prison Point CSO Facilities” tour or “Estuaries and TMDLs” session are examples. Registration is free for students. The program and registration form may be downloaded from [www.newea.org](http://www.newea.org). Note that the registration deadline is January 7<sup>th</sup> and seating for the tours is limited. It is also recommended to visit the exhibit floor. Students currently on the job market should dress in interview suit and bring their CVs, as consultants often have booths. A 1-page (single spaced) essay describing what you participated in and what you learned is due on February 16, 2005. If your work schedule prohibits you from attending the conference you may instead write a 5-page (single spaced) paper about water quality of the lower Charles River.



**Homework Assignments.** There will be approximately 10 homework assignments. Solutions are to be handed in to the instructor or TA or left outside of the instructor’s office on or before the due date. Solutions will be provided after the due date.

**Exams.** There will be a mid-term and a final exam. The exams will be open book and open notes.

**Grading.** A grade of incomplete will not be granted unless, prior to the final examination day, the student has made specific arrangements for how and when the course requirements are to be completed.

	<b>Points</b>
Homework	30
NEWEA Conf.	20
Mid-Term Exam	20
Final Exam	30
<b>Total</b>	<b>100</b>

**Work Presentation and Academic Honesty.** *Presentation Guidelines for Written Engineering Work* and the Northeastern University policy on academic honesty will be adhered to. I.e. no cheating.

**Changes to Syllabus.** This syllabus may change during the course of the semester. In that case the change will be announced in class.