

**CEE 793**  
**Modeling Surface Water Quality**

- Catalog data:** 20-CEE-793. Modeling Surface Water Quality. 3 ug./gr. cr. Mass conservation principles applied to coupled movement of water and reactive pollutants under steady and unsteady 1-D flow conditions through various water bodies in the natural environment (rivers, lakes, wetlands).
- Prerequisites:** Graduate standing or permission of instructor
- Textbook:** Thomann, R.V. and J.A. Mueller (1987) *Principles of Surface Water Quality Modeling and Control*, Harper and Row, Inc., 644 pp.
- References:** Chapra (1996) *Surface Water Quality Modeling*, McGraw-Hill  
Holly and Jirka (1986) *Mixing in Rivers*, Technical Report E-86-11, US Army Engineer Waterways Experiment Station, Vicksburg, MS.  
Brown and Barnwell (1987), *Enhanced Stream Water Quality Models QUAL2E & QUAL2E-UNCAS*, EPA/600/3-87-007, Athens, GA.
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- Goals:** To derive and apply analytical and numerical methods for modeling the fate and transport of contaminants moving in surface waters.
- Lecture or lab topics:**
1. Overview of watershed hydrology and river hydraulics (2 classes)
  2. Mixing, dispersion and initialization (1 class)
  3. Advective-dispersive (1-D) transport in rivers (3 classes)
  4. BOD and dissolved oxygen (1 class)
  5. Introduction to QUAL2EU (2 classes)
  6. Parameter estimation and uncertainty analysis (2 classes)
  7. Water quality in lakes (2 class)
  8. Kinematic models for transport in rainfall runoff (1 class)
  9. TMDLs: characterizing and controlling nonpoint sources (1 class)
  10. Sediment yield and sediment transport (2 classes)
  11. Partitioning and toxic substances (2 classes)
  12. Exam (1 class)
- Computer usage:** Students run QUAL2EU to simulate dissolved oxygen profile for Little Miami River.
- ABET criterion 3:** a, e, g, j, k
- ABET criterion 8:** a, b, f
- Date prepared:** January 28, 2003  
Last Update : April 25,2007