Fall 2002

CE 7100

WATER RESOURCES SYSTEMS ANALYSIS

Instructor: Prof. Heidtke
Office: 2160 Engineering Bldg.
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Office Hrs: Monday & Wednesday 11:00am – 3:00pm
Tuesday & Thursday 1:00pm – 3:00pm, 5:00pm – 7:00pm

Course Goal: To provide in-depth coverage of regional/national legislation pertaining to surface water quality management, along with engineering methods and systems analysis techniques used to develop, evaluate, and implement cost-effective water quality management strategies.

Course Objectives: To provide a practical understanding of the evolution of water quality regulations and standards in the U.S. in general and the Great Lakes region in particular; to develop an understanding of engineering methods (including mathematical models, statistical procedures and optimization techniques) used to evaluate alternative strategies for achieving compliance with water quality objectives (including waste load allocation procedures and derivation of NPDES permit limits for pollutant discharges); to provide students with knowledge concerning important tradeoffs between incremental benefits and costs associated with watershed management programs.

Course Outline

I. Introduction and course overview

II. Water Law

A. Federal legislation and regulations
   i) Clean Water Act
B. Regional legislation/agreements
   i) Great Lakes Water Quality Agreement
   ii) Great Lakes Initiative/Great Lakes Water Quality guidance
C. State doctrines of water ownership/water rights

III. Waste Load Allocations and Discharge Permit Derivation

A. Aquatic life, wildlife and human health criteria
B. Chronic vs. acute criteria
C. Maximum daily permit limit
D. Case study for trace metals
MID-TERM EXAM

IV. Models for waste load allocation assessment
   A. Steady-state vs. dynamic models
   B. Multiple discharge analysis using MULTI-SMP
   C. Single discharge analysis for toxics using SMPTOX

V. Systems analysis tools and applications in waste load allocations and watershed management
   A. The Total Maximum Daily Load (TMDL) process
   B. WLA methods for single dischargers
   C. WLA methods: rivers and streams (dissolved oxygen)
   D. WLA methods: lakes and impoundments (nutrients)
   E. Derivation of TMDLs for surface water systems

Grading System:
   A. Mid-Term Exam…… 40%
   B. Homework…………  5%
   C. Project/Presentation…15%
   D. Final Exam…………..40%

   100%

All exams will be open book/open note.

Text: Course Pack

Final Exam Date:  Tuesday, December 17th, 7:30-9:30

Homework Policy:  All homeworks are due at the start of class one week after the date assigned.

Cheating Policy:   Cheating will not be tolerated. Any student caught in an act of cheating will receive a grade of E in the course and may be subject to expulsion from the University.

Important Dates:  Last day to drop a class with tuition refund:  Monday, September 16th
                  Last day to drop a course: Thursday, December 12th.