Fall 2012

Environmental Systems I - University of Illinois, Urbana

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CEE 434
Environmental Systems I – Fall 2012

Instructor:
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Class time and room:
Tu & Th 9:30-10:50
1311 Newmark
Office hours: M&W:
1:30-3:00

Prerequisites
CEE 201, CEE 330 and CEE 350 or equivalents

Texts

- *Water Resources Systems Planning and Management-An Introduction to Methods, Models and Applications* by Loucks and van Beek, available online: http://ecommons.cornell.edu/handle/1813/2804

- *Environmental System Analysis* by Eheart, prints can be purchased from CEE copy room

Supplemental References
1. Chapter 5 from *Comprehensive Water Distribution Systems Analysis handbook* by Boulos/Lansey/Karney (PDF is in the website with Compass)

2. Chapter 4 from *Comprehensive Handbook on Water Quality Analysis for Distribution Systems* by Lansey and Boulos (PDF is in the website with Compass)

3. *Civil and Environmental Systems Engineering*, ReVelle et al., 1997.

Class Web Site
Our course is on the Illinois Compass web-based course system. Log in at http://compass.uiuc.edu

Grades

Homework & term projects	40%
Mid-term Exams	30%
Final Exam	30%

95% +	A +	90%-95%	A	88%-90%	A-	85%-88%	B +	80%-85%	B
78%-80%	B-	75%-78%	C +	70%-75%	C	68%-70%	C-	55%-68%	D
0 - 55%	F								

(Lower bound included but upper bound not included for each grade)

Class participation is STRONGLY required.

Homework and Exam Policies

There are assignments for both individual students and groups. Group assignments can be conducted by groups of up to three students. Homework copied from others will result in 100% penalty. Late homework without a valid excuse given in advance will be penalized by 30%.

All exams are open-note, open-book. Note that team effort on exams is strictly prohibited. The University guideline on make-up examination will be strictly followed.

Proposed Syllabus

Topics	No. Lectures	Reading list
1. Introduction 1.1. Environ. and Water Resources Systems 1.2. General Procedures for Systems Analysis	**1**	E Ch. 1, L Ch. 1, Liu et al. (2007)
2. Principles and Methods of Optimization 2.1 Linear Programming (LP) 2.2 Nonlinear Programming (NLP) 2.3 Genetic Algorithms (GA) 2.4 Multiple Objective Programming (MOP) 2.5 Stochastic Optimization (SO) 2.6 Dynamic Programming (DP)	**9**	L Ch. 2 Ch. 4(5) Ch. 4(3), handout handout L Ch. 10 (skip 5.5.4-5.5.6) L Ch. 8 (1-4, 6), Ch 9 (1-3) L Ch.4(4)
3 Water Resources Systems 3.1 Reservoirs 3.2 Aquifers 3.3 River basins **Mid-term exam**	**6**	Ch.11 (skip 2.3, 2.4)
4. Water distribution systems analysis 4.1 Introduction: problems and scope 4.2 Water distribution systems simulation 4.3 Water quality simulation 4.4 Water distribution systems optimization	**9**	Handouts, L. Ch.13 (2, 5)
5 Water Quality Systems 6.1 Analysis of Regulatory Policy and Programs 6.2 Illustrative Example – A Case Study	**5**	E Ch.3, Ch.4 L Ch 12 (1 - 4, 6, 7)

Notation: L- text of Loucks et al.; E- text of Eheart; Liu et al. (2007), a paper published by *Ambio* Vol. 36, No. 8.