University of Connecticut Spring 2010

CE/ENVE 3220- Water Quality Engineering

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Course objectives:

- to learn the fundamental theories and principles of water and wastewater treatment processes
- to develop fundamental skills for the analysis and design of water collection/transmission systems, and wastewater collection systems
- to utilize the physical, chemical and biological approaches for pollution control
- to provide a foundation and overview of water supply/wastewater treatment engineering
- to analyze and quantitatively describe natural and engineered processes in environmental engineering

Prerequisite: basic knowledge of water chemistry, calculus, and ordinary differential equations.

Primary Textbooks:
Warren Viessman Jr. and Mark J.Hammer, *Water Supply and Pollution Control.* 8nd edition, Addison & Wesley, 2009.

Compiled hand-outs and class-notes

Course Hours: 2:00-2:50 pm, MWF

Course Credits: 3

Classroom: Castleman Building 201

Office Hours: 3:00-4:00 pm Monday and Wednesday or by appointment

Examinations and Quizzes:
There will be one mid-term examination and one final comprehensive examination.

Problem Sets: Problem sets will be assigned during the semester as an aid in exam preparation. Homework will be graded, and the solutions will be posted on the internet or sent as hand-outs.

Grading:

Homework:	25%
Class performance:	15%
Mid-term Exam:	25%
Final Exam:	35%

Course Policy:

Homework is due by 2:00 pm one week after the day it was assigned unless specified otherwise. Homework solution will be posted on the bulletin board outside my office on the following day. Late homework will NOT be graded.

University, college, and/or department policies will be applied for missed exams.

<u>Note to regarding academic integrity:</u> Academic integrity requires that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts. Academic integrity includes a commitment not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

Course Schedule (Tentative):

Class No.	Day	Topic	Content in textbook	HW
Community planning, Water Sources				
1	WF	Introduction, water uses, Water and wastewater flows, Hydrologic cycle, Water storage, groundwater	CH1, CH2, CH3, CH4	
Water Treatment Processes				
2	MWF	Water quality, contaminants, Coliform test, Overview of water and wastewater treatment processes	CH8, CH9	HW1
3	MWF	Zeta potential, double-layer theory, Mixing and flocculation	10.9, 11.11-11.14	
4	MWF	Coagulation and flocculation (continue)	11.11-11.14	HW2
5	MWF	Sedimentation, filtration	10.8-10.19	
6	MWF	Basic chemical principals, water softening, water disinfection	11.1-11.6, 11.15-11.17	
7	MWF	Water softening, and water disinfection (continue)	11.21-11.30	HW3
Wastewater Treatment Processes				
8	MWF	Dissolved oxygen sag curve ******Midterm******	12.1-12.9	
9	MWF	Activated sludge process, oxygen requirement	12.19-12.30	HW4
10	MWF	Activated sludge process (continue)	12.19-12.30	
11	MWF	Activated sludge process (continue)	12.19-12.30	
12	MWF	Trickling filter, rotating biofilm reactors (RBC), natural treatment systems (lagoons/ponds)	12.12-12.18, 12.27-12.30	
13	MWF	Sludge generation, sludge characteristics, Sludge treatment	CH 13	HW5
14	MWF	Sludge treatment (continue), Advanced wastewater treatment, water reuse	CH 13, CH14	
Final exam (During the final week)				