School of Engineering
University of Guelph
URBAN WATER SYSTEMS DESIGN
ENGG*4370

Course Outline – Fall 2008

Calendar Description:
Estimation of water quantity and quality needed for urban water supply and drainage. Design of water supply, pumping systems, pipe networks and distributed storage reservoirs from analysis of steady and transient, pressurized and free surface flow. Rates of generation of flows and pollutants to sanitary and storm sewers, design of buried pipe and open channel drainage systems with structures for flow and pollution control. Modelling of water systems for sustainable urban development.

Prerequisites:
Prerequisites: ENGG*2230, ENGG*3650

Objectives:
At the successful completion of this course, the student will have demonstrated the ability to:

(i) Apply the laws of conservation of mass, energy and momentum to the analysis of hydraulic conditions in pipes flowing full or partially full
(ii) Apply knowledge of design considerations and employ software to design water distribution and wastewater collection systems
(iii) Translate an understanding of the effects of urbanization on the urban hydrologic cycle to specification of stormwater management requirements
(iv) Utilize knowledge of a broad suite of stormwater management alternatives to perform preliminary screening given design constraints and criteria
(v) Integrate preventative design techniques into engineering solutions.

Faculty:
Andrea Bradford, PhD., P.Eng.
Room 1342, Thornbrough Building.
Office Hours: Thursdays 9:00 – 11:00 am
Fridays 1:30 - 2:30 pm
e-mail: abradfor@uoguelph.ca

Teaching Assistants: Andrew Fedoruk, afedoruk@uoguelph.ca

Class Times and Locations:

Lectures	Monday	11:30 – 12:20	Room 121 MACS.
	Wednesday	11:30 – 12:20	Room 121.MACS
	Friday	11:30 – 12:20	Room 121 MACS
Tutorial	Monday	15:30 – 17:20	Room 2313 THRN

Note: A lecture and tutorial are also scheduled Thursday, November 27 (make up day for Thanksgiving Monday).

Text:
Chin, D.A., 2006. *Water-Resources Engineering*. 2nd Edition. Prentice Hall. 962 pp.

Blackboard/Web CT:
Some of the overheads and slides presented in lectures will be made available. Links to other resources will be provided.

Course Organization:

Lectures will be organized in three modules. The stormwater management module has been moved to the beginning of the term based on feedback from previous classes. Computer models – EPASWMM and EPANet – will be introduced during tutorial periods.

Module 1: Stormwater Management

- effects of urbanization
- stormwater management objectives, design criteria and approaches
- overview of alternative stormwater management practices
- screening design alternatives/constraints
- hydrology review – precipitation and abstractions
- rational method
- major/minor systems
- lot level controls
- open channel hydraulics review
- conveyance controls
- end-of-pipe controls
- reservoir routing review
- cold climate design
- construction and maintenance
- low impact development – better site design, pollution prevention

Module 2: Wastewater Collection Systems

- hydraulics review – partial pipe flow
- wastewater design flows
- design considerations
- example problem

Module 3: Water Distribution Systems

- hydraulics review – pressurized pipe flow
- example problems
- design flows
- water distribution design considerations
- design of storage facilities
- water quality

Evaluation:

Problem sets	-	no grade
Term tests	-	40%
Design Project		
Products	-	40%
Process	-	20%

Problem Sets:

Assignments will be given throughout the semester. They will not be submitted and no grade will be assigned for their completion. You are responsible for the material that is reflected by these assignments.

Term Tests:

Friday, October 24, 2008. 11:30 am - 12:20 pm. MACS 121
Friday, November 14, 2008. 11:30 am – 12:20 pm. MACS 121

Design Project:
The design project will involve design of water distribution, wastewater collection and stormwater management systems for a residential subdivision. The project will be done by design teams. Evaluating only the products of your design project does not emphasize the importance of developing your transferable design skills. Therefore, individual and collective design competencies such as communication, project management, consensus building and leadership will also be evaluated.
Proposal due: **Monday, September 22, 2008. 11:30 am.**
Progress meetings will be scheduled during Week 8 of the term (Week of October 27, 2008).
Design report due: **Friday, November 21, 2008. 4:00 pm**. Late reports will not be accepted.
Presentations will be scheduled during the final week of classes.
Logbooks are due **Thursday, November 27, 2008. 4:00 p.m**.

Field Trip
Tentatively Monday, September 22, 2008.

Please Note:
The Regulations concerning Academic Misconduct as outlined in the University of Guelph, Undergraduate Calendar for 2008-2009 will be strictly enforced.

Disclaimer:
The instructor reserves the right to change any or all of the above in the event of appropriate circumstances, subject to University of Guelph Academic Regulations.