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

Course Outline – Fall 2010

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: please arrange an appointment by email
e-mail: abradfor@uoguelph.ca

Teaching Assistant: Peter Dekker, pdekker@uoguelph.ca Office Hours: TBD

Class Times and Locations:

Lectures	Monday	10:30 – 11:20	Room 300 MINS
	Wednesday	10:30 – 11:20	Room 300 MINS
	Friday	10:30 – 11:20	Room 300 MINS
Tutorial	Monday	13:30 – 15:20	Room 2313 THRN

Note: Lecture and tutorials are also scheduled Thursday, December 2nd (make up day for Thanksgiving Monday).

Text:

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

Courselink/D2L:

Some of lecture material will be made available. Links to other resources will be provided.

Course Organization and Proposed Schedule (subject to adjustment):

Week	Lecture Content (*Italics – course content not covered in lecture)*	Design Tutorial	Important Dates
1 F, M, W	Effects of Urbanization Course Outline Stormwater Management (SWM) Objectives Overview of SWM Practices	Introduction to Design Project Introduction to EPASWMM	
2 F, M, W	Overview of SWM Practices Cont'd Screening Level Design Hydrology Review *Better Site Design, Pollution Prevention*	Handout Hydrology Review SWMM Runoff	
3 F, M, W	Design Criteria Test in Lecture Slot Guest Lecture: LID	Handout Hydraulics Review SWMM Conveyance	**TEST 1: Monday, September 27**
4 F, M, W	Lot-level Controls Open Channel Hydraulics *Gutters, Inlets* Bioswale/Bioretention Design	**FIELD TRIP**	
5 F, W, F	Bioswale/Bioretention Design Cont'd Ponds/Wetlands Pond Design/Routing	Thanksgiving – No Tutorial	**Report 1: Friday, October 8**
6 M, W, F	Pond Routing Example SWM Cold Climates/Maintenance Hydraulics for Water Distribution Systems	SWMM Detention Ponds SWMM LID	
7 M, W, F	Design Considerations for WDS Water Network Analysis, Quality Guest Lecture: Safety WDS	Introduction to EPANet	**Report 2: Friday, October 29**
8 M, W, F	Storage Facilities Integrated Urban Water Management Guest Lecturer: Integrated Urban Water Management	EPANet Practice Tutorial	
9 M, W, F	Partial Pipe Hydraulics WW Design Considerations	Test in Tutorial	**Test 2: Monday, November 8**
10 M, W, F	Guest Lecturer – Concrete Pipe Products Corrosion Sanitary Sewer Design Example	Work on Projects	
11 M, W, F	Combined Sewers and CSOs Guest Lecturer – Corrugated Steel Pipe	Work on Projects	
12 M, W, Th	Legislation, regulation, guidelines Exam Review	Work on Projects	**Report 3: Wednesday, Dec. 1** **Peer and Self-Evaluation: Thursday, Dec. 2**
FINAL EXAM			**Saturday, Dec. 11**

Evaluation:

Stormwater Management Test	-	10%
Water Distribution Test	-	15%
Design Project	-	50%
Final Exam	-	25%

Tests:

Test 1: Stormwater Management Test:
Monday, September 27, 2010. 10:30 am - 11:20 pm. MINS 300

Test 2: EPANET / Water Distribution Test:
Monday, November 8, 2010. 1:30 pm - 3:30 pm. 2313 THRN

Design Project:

The University campus has been divided into areas predominantly covered by buildings and parking areas. Each team of 4 students will design LID retrofits for one area. Designs will be completed and shared with other groups by week 7 of the 12 week semester, with subsequent weeks devoted to modelling and assessment of the collective system.

Important Project Dates:

Preliminary Report (Report 1) due: **Friday, October 8, 2010. 10:30 am.**
Design Submission (Report 2) due: **Friday, October 29, 2010. 10:30 am.**
Final Report (Report 3) due: **Wednesday, December 1, 2010. 4:00 pm.**
Reflective Self and Peer Evaluation due: **Thursday, December 2, 2010. 4:00 p.m**.

Final Examination

The final examination is scheduled for Saturday, December 11, 2010. 7:00 pm.

Please Note:

The Regulations concerning Academic Misconduct as outlined in the University of Guelph, Undergraduate Calendar for 2009-2010 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.