

**SCHOOL OF ENGINEERING
UNIVERSITY OF GUELPH
ENGG*2550: WATER MANAGEMENT
WINTER 2011 - Course Outline**

Calendar Description:

The influence of fundamental engineering and hydrologic principles on the choices available for management of water on a watershed basis is demonstrated for representative techniques used in management for water supply, irrigation, flood control, drainage and water pollution control. Selected problems are studies to reveal the technical, environmental, legal, jurisdiction, political, economic and social aspects of water management decisions.

Prerequisites: (CHEM*1040 or CHEM*1310), GEOG*2000

Objectives:

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

- 1) an appreciation of watershed management principles and techniques
- 2) the ability to identify and discuss the multiple dimensions of global water management issues
- 3) the ability to perform quantitative analyses of water resources – groundwater, lakes, rivers, wetlands – and the effects of human activities on these water resources
- 4) knowledge of the tools and techniques used in water management and the ability to apply this knowledge to develop solutions to water management challenges
- 5) an understanding of Ontario's legislative framework for water management

Faculty:

Andrea Bradford, PhD., P.Eng.
Room 1342, Thornbrough Building.
Office Hours: By Appointment.
e-mail: abradfor@uoguelph.ca

Teaching Assistant: None

Class Times and Locations:

Monday, Wednesday, Friday 10:30 – 11:20 MACK 309

Textbook: None Required

Course notes:

Most lectures will be conducted using a document camera or computer projector. Selected lecture notes will be provided on Courselink but students are expected to provide further annotation and may need to take full notes on some topics.

Other resources:

Required readings will be assigned weekly. Students should be prepared to discuss the required readings during the lecture periods. Other recommended readings may also be suggested.

Proposed Course Organization (subject to adjustment):

Week 1: Fundamental water management concepts and themes for the course

Properties of water. Inter-relationship of land, air and water systems. Inter-relationship of quality and quantity. Competing demands and the multiple dimensions of water management - social, economic and ecologic. Water budgets. Unintended consequences.

Week 2: Water Supply and Demand Management

Groundwater and surface water sources. Water quantity and quality requirements. Demand management. Low water response. Alternative supplies. International challenges.

Week 3: Introduction to Watershed Management

Definition and delineation of watersheds. The hydrological cycle within watersheds. Important principles of watershed management. Integrated watershed management.

Weeks 4 and 5: Rivers

Physical, chemical, and biological characteristics of rivers. Flow measurements. Fluvial geomorphology. Effects of urbanization on streams. Stream restoration. Flood management. Ecological flow assessment.

Week 6: Groundwater and Surface Water: A Single Resource

The subsurface environment. Groundwater flow. Groundwater – surface water interactions. Introduction to geochemistry. Effects of human activities. Analysis and management tools including monitoring and models.

Reading Week

Week 7: Wastewater Management

Wastewater treatment processes. On-site systems. Pollution prevention. Stormwater management.

Week 8: Multiple Barrier Approach to Protecting Drinking Water. Legislation and regulations in Ontario. Source protection. Water treatment processes.

Week 9: Lakes

Physical, chemical, and biological characteristics of lakes. Thermal stratification. Nutrient cycles. Eutrophication. Buffering capacity. Lake Winnipeg Case Study.

Week 10: Wetlands and Presentations

Wetland types and functions. Wetland hydrology. Wetland policy. Minesing Swamp Case Study. Wetland restoration.

Week 11: Presentations

Week 12: Presentations and Wrap-up

Evaluation:

Presentation / Briefing Note	-	30%
News Critique	-	20%
Problem Sets	-	20%
Final examination	-	30%

Wednesday, April 13 8:30-10:30

Problem Sets:

During the semester there will be four (4) problem sets. Each problem set will be handed out at least one week prior to its due date. Late submissions will not be accepted.

Please Note:

The Regulations concerning Academic Misconduct as outlined in the University of Guelph, Undergraduate Calendar for 2010-2011 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.

ENGG*2550: WATER MANAGEMENT Winter 2011 – Assignments

Critique of Media Coverage (Newspaper Article) of a Water Issue or Event

The assignment is to follow “Water in the News,” select a current event or issue which has been reported in the popular media, and write a critique of the media coverage. The media coverage must include at least one article in print (or available on news agency website) which must be handed in with the critique.

The critique, which should be about 5 pages (12 point font, 1.5 line spacing, 3 cm margins), should include a brief description of the issue or event, discussion of the dimensions of the issue which were reported, and comment on potential dimensions of the issue which were not addressed by the media coverage.

The critique must be printed on paper and also provided as an email attachment to the instructor by the due date. The hard copy will be returned, but an electronic copy will be retained. The assignment is due Wednesday, March 2 (10:30 am) but may be handed in at any time on or before that date. Late submissions will not be accepted.

The marking scheme for the critique is as follows:

Provision of newspaper clipping (s)	2.0
Quality / depth of discussion	12.0
Grammar	6.0
TOTAL	20.0

Presentation / Briefing Note

The assignment is to select a topic in water resources management and prepare a presentation and briefing note on this topic.

You should use at least eight primary references. Sources of information must be appropriately referenced. You should be aware that there are penalties for plagiarism at the University of Guelph and that the instructor will try to be both vigilant and vigorous in the scrutiny of work. You are expected to review “How to Avoid Plagiarism” posted on Courselink under Essential Information.

The presentation will be about 20 minutes. The briefing note should not be longer than five pages of text (12 point font, 1.5 line spacing, 3 cm margins). In addition, it must include a reference list and may include a few figures or tables.

The briefing note is due Monday, March 21 (10:30 am). The presentations will be scheduled during weeks 10, 11 and 12. Briefing notes must be printed on paper and also provided as an email attachment to the instructor by the due date. Papers will be returned, but an electronic copy will be retained. Late submissions will not be accepted.

The marking scheme for the briefing note is as follows:

Technical content	7.0
References (appropriate, current)	2.0
Structure (logical, clear, connected)	3.0
Grammar (correct in spelling, syntax, vocabulary)	3.0
TOTAL	15.0

The marking scheme for the presentation is as follows:

Technical content	
technically sound and free from error in fact or logic	3.0
content an appropriate level for 2 nd year course	3.0
demonstrated understanding of content	4.0
Quality of presentation	
Visual (e.g. not too much text; good use of illustrations; attractive slide design, free from typos / grammatical errors)	2.5
Oral (e.g. good eye contact, clear voice)	2.5
TOTAL	15.0

Topic Selection

The topic may be a:

- a) water management issue. The presentation should present the issue and its multiple dimensions which may be technical, ecological, social, political, legal, and /or economic. It should review management techniques which may be used to address the issue or water management analysis techniques which could help in the development of solutions.

- b) tool used in the analysis and/or management of water resources. The presentation should describe the tool and its applications in water management. It should review the benefits and drawbacks to the use of the tool and provide at least one case history of its application to analysis or management of a water management issue.

Tools and techniques may be based on the physical sciences, biological sciences, engineering, economics and/or social sciences. There are many acceptable topics. To avoid duplication of topics and to ensure that the scope of your selected topic is appropriate for the assignment, please have your topic approved by the instructor.