ERS 2016: Fall 2019

**Urban Water and Waste Water Systems: Integrated Planning and Management**

School of Environment, Resources and Sustainability, University of Waterloo

## 1. COURSE INFORMATION

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| Professor: | Evan Andrews (EV1 244H; e3andrew@uwaterloo.ca) |
| Teaching Assistant | Lauren Smith (lkmsmith@uwaterloo.ca)<br>*Neither of us is available to respond to e-mails between 5:00pm and 9:00am and on weekends* |
| Seminar | Tuesdays and Thursdays, 10:00am to 11:20am, EV2 2002 |
| Office hours | Thursdays, 11:30am to 12:30pm |
| On Learn | Class announcements, course materials, grades, etc. |
| Device Policy | Please restrict use of laptops, tablets, and phones for taking course notes. You will be asked to leave temporarily to finish any other business (e.g., calls, texts, social media, surfing). |

## 2. CONTEXT, CONTENT AND TEACHING

This is an elective course designed for senior students interested in urban environmental issues, with a focus on urban water services (drinking, waste, safety). Students should have previous knowledge of water issues, for example, ERS 101. This seminar extends and/or complements concepts learned in ERS 265 (Water History) and ERS 365 (Water Governance). This seminar is an essential foundation for a senior thesis (ERS 403) or interdisciplinary graduate studies on water issues (WATER 601 or WATER 602). This course is also useful for understanding the water and wastewater system that affects you in relation to systems around the world.

In this course, we will focus on urban water management using illustrative systems or cases from North America, South America, Western Asia, Southern Asia, and Australia. We will understand these urban water problems under conditions of considerable environmental uncertainty (e.g., from climate change, its influence on extreme events, development and urbanization and its influence of water supply and demand) and water management as a suite of different strategies to address these problems. Through attention to global and local changes, we will examine the core components of urban water and wastewater systems along with issues of demand and supply management planning, efficiency mechanisms, and concerns of equity and justice. Some things you should know:

a) Readings are the foundation of this course. Readings must be done BEFORE the assigned class meeting.

b) Seminar discussions and guest lectures are designed to provide an overview of key concepts/cases and highlight important ideas from the readings. Don't assume that taking notes in class will mean you don't need the readings.
c) The readings, discussions, lectures and video content should be considered as an integrated whole, with each component adding and/or reinforcing key ideas. Virtual field trip(s) provide additional concepts explored in the textbook and in class discussions.
d) In-class activities are critical to your success because they're designed to extend and reinforce your knowledge foundation (i.e., depth and breadth). You'll need to apply what you've learned from both the seminar notes and readings material to effectively participate in class discussions and activities. This participation will benefit your brain and, overall, your final grade.

This syllabus is a contract between us: if you have any questions, please speak with me before September 19th 2019. Until this time, changes may be made to any of the assignment due dates and course plan content.

## 3. LEARNING OUTCOMES

By the **end of each week** you will be able to:
a) Articulate and summarize the key concepts from the readings and class lecture and/or discussions.
b) Express the key concepts using different modes to organize and communicate your thoughts.

By the **end of the semester** you will be able to learn, develop, and communicate:
a) Content: Identify and describe municipal water and wastewater systems and their subcomponents.
b) Context: Explain, using case examples, how climate change influences water management components at an urban/municipal scale.
c) Analysis: Assess the benefits and problems associated with water efficiency technologies, techniques in different urban applications, e.g., residential and Industrial-Commercial-Institutional) and contexts, e.g., North America vs. Developing Nation-States.
d) Criticisms: Recognize and evaluate the positions, assumptions and conventions within the water management literature by dissecting specific debates, e.g., supply vs. demand paradigms; water pricing and social equity etc.

## 4. REQUIRED AND RECOMMENDED READINGS

***Required Books*** Available through the UW bookstore or many used copies in circulation.

Sedlak, David. Water 4.0. the past, present and future of the world's most vital resource. Chapters 1, 2, 3, 10, 12. **NOTE**: this book is also available as a free e-book the UW library.

Yudelson, Jerry (2010). Dry Run: Preventing the next urban water crisis. New Society Publishers.

***Required Articles and Chapters*** These are all available as pdfs through the library course reserve (3 hours).

Bilton, Chris (2008). Storm warning: Hurricane Hazel and the evolution of flood control in Toronto. Chapter in: Reeves, W and C. Palassio (Eds). Toronto's water from Lake Iroquois to lost rivers to low-flow toilets. Coach House Books, Toronto, Canada. Pg 82-91

Cook, Michael (2008). Water underground: exploring Toronto's sewers and drains. Chapter in: Reeves, W and C. Palassio (Eds). Toronto's water from Lake Iroquois to lost rivers to low-flow toilets. Coach House Books, Toronto, Canada. Pg. 184-203

Feitelson, E. (2012). What is water: A normative perspective. Water Policy 14, 52-64.

Goldman, J.L. (2017). Why Smart Cities Are Turning Themselves Into Sponges. Politico Magazine. http://www.politico.com/magazine/story/2017/04/20/innovative-infrastructure-storm-water-system-215055. April 20, 2017

Williamson, Ronald F. and Robert I. MacDonald (2008). A resource like no other: understanding the 11 000 year relationship between people and water. Chapter in: Reeves, W and C. Palassio (Eds). Toronto's water from Lake Iroquois to lost rivers to low-flow toilets. Coach House Books, Toronto, Canada.

**Recommended Book:** Hay, Iain and Philip Giles (2010). *Communicating in Geography and Environmental Sciences: Canadian Edition (Paperback).* Oxford University Press. Available at the bookstore.

## 5. COURSE ASSIGNMENTS

| ASSIGNMENT | VALUE | DATE |
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| In Class Test A (weeks 1, 2 and 3) | 25% | |
| In Class Test B (weeks 5, 6 and 7) | 25% | |
| In Class Test C (weeks 9, 10 and 11) | 25% | |
| Weekly Seminar Presentation and Report, ~ four-person team<br><br>An opportunity to teach the class (20 minutes maximum) the key concepts from the assigned materials for that week (including lectures). Sign up for one of the ten classes to present your thoughts and to lead an interactive seminar discussion. | 25%<br><br>(10% presentation + 15% report) | Seminar presentation in class on one of the ten available slots (see Course Plan)<br><br>The Team's report due the DAY AFTER class by 12pm emailed to Evan Andrews as a .docx file). |

## 6. COURSE PLAN AND READINGS

| Week | Tuesday | Thursday | Core Concept(s) | Readings |
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| 1 (Sept. 5th) | No Class | Admin and course review;<br>Virtual field trip and discussion | Problem Orientation | Just come as you are |
| 2 (Sept. 10th and 12th) | Lecture;<br>Reading comprehension activity | Introduction to analysis and criticism of systems and cases;<br>Standpoint clarification activity | Urban water history | Sedlack Ch. 1 & 2;<br>Williamson and MacDonald (2008) |
| 3 (Sept. 17th and 19th) | Lecture;<br>Reading comprehension activity | Virtual field trip and discussion | Components of water and wastewater systems | Yudelson Ch. 4 |
| 4 (Sept. 24th and 26th) | Lecture | Case Study | Patterns and crises in | Yudelson Ch. 2 & 3 |

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| | | | urban water use | |
| 5 (Oct. 1st and 3rd) | Weekly seminars and presentations (two slots available) | In Class Test A | Patterns and crises in urban water use | Review your notes and reflections |
| 6 (Oct. 8th and 10th) | Weekly seminars and presentations (two slots available) | Lecture; Guest speaker (TBC) | Blue and grey water | Fietelson (2012); Sedlack Ch. 10; Yudelson 7 & 8 |
| | Thanksgiving Holiday and Reading Week Break (Oct 14th to 18th) | | | |
| 7 (Oct. 22nd and 24th) | Weekly seminars and presentations (two slots available) | Lecture; Guest speaker (TBC) | Brown and black water | Sedlack Ch. 3; Yudelson Ch. 9 & 10 |
| 8 (Oct. 29th and 31st) | Weekly seminars and presentations (two slots available) | Lecture; Case Study | Green and 'new water supplies' | Bilton (2008); Cook (2008); Goldman (2017) Yudelson Ch. 11 & 13 |
| 9 (Nov. 5th and 7th) | Lecture; Synthesis activity | In Class Test B | Synthesis | Review your notes and reflections |
| 10 (Nov. 12th and 14th) | Lecture | Case Study | Residential water efficiency | Yudelson Ch. 6 |
| 11 (Nov. 19th and 21st) | Weekly seminars and presentations (two slots available) | Lecture | Industrial, Commercial and Institutional water efficiency | Yudelson Ch. 5 |
| 12 (Nov. 26th and 28th) | Lecture | Virtual Fieldtrip and Discussion | Preventing the next | Sedlack Ch. 12; Yudelson Ch. 15 |

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| | | | urban water crisis | |
| 13 (Dec. 3rd) | In Class Test C | No Class | N/A | Review your notes and reflections |

## 7. THE STUDENT'S RESPONSIBILITIES

As a student at the University of Waterloo, you have the following responsibilities. Contact me to discuss any concern you have regarding your responsibilities as outlined here.

**Communication:** It is your responsibility to check the course web page for information and updates. Also, as per university regulations, e-mail is the official route of communication between the University and its students. You are required to check your uwaterloo.ca e-mail account regularly (at least once per day). If you use another e-mail service, it's your responsibility to ensure that mail sent to your university account is forwarded.

**When You Cannot Meet a Course Requirement: When** you find yourself unable to meet an in-course requirement because of medical, psychological or compassionate reasons, please advise me in writing (preferably by e-mail), with your name, student ID number, and e-mail contact information. Where possible, this should be done in advance of the assignment due date, but otherwise as soon as possible after the due date. As a rule, you must provide appropriate documentation, for example, a note from your doctor indicating the dates during which you were ill,
and describing the severity of your illness. You are required to attend (and participate in) all of the class meetings and field trips. Assignments must be submitted in D2L on the designated day and time.

**Manage your time carefully:** Pressure of work alone is not an acceptable reason for seeking an extension without penalty. See the undergraduate calendar for additional information on regulations and procedures for Academic Consideration.

## 8. ACADEMIC INTEGRITY

**Academic Integrity:** In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. www.uwaterloo.ca/academicintegrity/. Students who are unsure what constitutes an academic offence are requested to visit the on-line tutorial at: http://www.lib.uwaterloo.ca/ait/

**Research Ethics:** Please also note that the 'University of Waterloo requires all research conducted by its students, staff, and faculty which involves humans as participants to undergo prior ethics review and clearance through the Director, Office of Human Research and Animal Care (Office). The ethics review and clearance processes are intended to ensure that projects comply with the Office's Guidelines for Research with Human Participants (Guidelines) as well as those of provincial and federal agencies, and that the safety, rights and welfare of participants are adequately protected. The Guidelines inform researchers about ethical issues and procedures which are of concern when conducting research with humans (e.g. confidentiality, risks and benefits, informed consent process, etc.). If the development of your research proposal consists of research that involves humans as participants, the please contact the course instructor for guidance and see: www.research.uwaterloo.ca/ethics/human/

**Note for students with disabilities:** The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.

**Religious Observances:** Please inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

**Grievance:** A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4, www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt, please contact your Undergraduate Advisor for details.

**Discipline:** A student is expected to know what constitutes academic integrity, to avoid committing academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, www.adm.uwaterloo.ca/infosec/Policies/policy71.htm. For typical penalties, check Guidelines for Assessment of Penalties, www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm

**Appeals:** A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances (other than a petition) or Policy 71 – (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals). See: www.adm.uwaterloo.ca/infosec/Policies/policy72.htm

**Consequences of Academic Offences:**

*A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline,*

*http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm*

*Within ENV, those committing academic offences (e.g. cheating, plagiarism) will be placed on disciplinary probation and will be subject to penalties which may include a grade of 0 on affected course elements, 0 on the course, suspension, and expulsion.*

*Students who believe that they have been wrongfully or unjustly penalized have the right to grieve; refer to Policy #70, Student Grievance,*
***http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm***

ENV students are strongly encouraged to review the material provided by the university's Academic Integrity office (see: http://uwaterloo.ca/academicintegrity/Students/index.html).