

Water Resource Economics

ECON 484/673

Fall 2022 - Course Outline

Professor: Roy Brouwer
Class time and location: Mondays and Wednesdays 4:00 – 5:30 pm, room HH 1102
Consultation hours: Fridays 9:00 – 10:00 am
Contact information: rbrouwer@uwaterloo.ca

Course description:

This is a topics course. The course consists of classes in which the economics of major global water management challenges will be addressed, including droughts and floods, water quality, water resource recovery, and the water-food-energy nexus. Particular attention will be paid to water resources valuation and pricing, focusing on market and non-market valuation methods. Students will play a water game in class, do an intermediate test related to the water game and write an assignment and a discussion paper.

The assignment paper is a multi-author (group) assessment of dam building in a transboundary river basin. The paper size is between 3,500-4,000 words. The assignment relates to a real-world water management challenge for which data will be made available to conduct a Cost-Benefit Analysis (CBA). The assignment paper will be submitted before it is presented by each group of students in class in week 11. The due date for the assignment paper is November 11, 2022 (before 5 pm).

The discussion paper is a single author review of an article of a student's own choice published in the journal *Water Resources & Economics*. The paper size is between 2,000-2,500 words. Students can work on this review paper from the beginning of the course. Once the article of interest has been identified, the student informs the instructor about the selected article and when approved, the student can start writing the paper. This review paper is due at the end of the course on December 2, 2022 (before 5 pm).

The intermediate test, the assignment paper and the review paper each count for 25% of the overall grade. The course will end with a final exam, which will make up the last 25% of the final grade for the course. The exam will be based on the material covered in class.

The course grade will be at the discretion of the instructor. The guidelines for this are as follows. All components making up the final grade are equally graded and weighted across undergraduate and graduate students. Graduate students will be given an extra question in the intermediate test linked to the water game in week 8 and in the final exam.

Course schedule

Week	Date	Course description	Reading material	Assignment	Weight
1	09/07	Course introduction			
2	09/12-09/14	The relationship between water and the economy	Olmstead (2010a,b)		
3	09/19-09/21	Supply and demand of water	Griffin, chapter 2		
4	09/26-09/28	Empirical estimation of supply & demand	Griffin, chapter 3		
5	10/03-10/05	Cost-benefit analysis (CBA)	Brouwer (2022)		
6	10/10-10/12	Reading week – no classes			
7	10/17-10/19	Water pricing	Griffin, chapter 9		
8	10/24-10/26	Water game	Seibert and Vis (2012)	Intermediate test	25%
9	10/31-11/02	Watershed cooperation & Payments for watershed services	Brouwer (2018)		
10	11/07-11/09	Economic valuation of water	Young, chapter 2	Submission assignment paper (11 November)	25%
11	11/14-11/16	Presentation CBA assignment & field trip Kitchener wastewater treatment plant (optional)			
12	11/21-11/23	Nonmarket valuation methods: revealed preference methods	Young, chapter 4		
13	11/28-11/30	Nonmarket valuation methods: stated preference methods	Johnston et al. (2017)	Submission discussion paper (2 December)	25%
14	12/05	Recap: what have we learned?			
Final exam					25%

Required background: Knowledge of microeconomic theory, basic calculus and linear algebra and some experience with differential equations are required.

Readings:

- Brouwer, R. (2018). Payments for ecosystem services. In: Potschin, M., Haines-Young, R., Fish, R. and Turner, R.K. (eds). *Handbook of Ecosystem Services*. Routledge, London and New York.
- Brouwer, R. (2022). Economic analysis of resource recovery. In: Pikaar, I. et al. (eds.). *Resource Recovery from Water: Principles and Application*. IWA Publishing. Doi: 10.2166/9781780409566_0365.
- Griffin, R.C. (2016). *Water resource economics. The analysis of scarcity, policies and projects*. Cambridge, MA, MIT Press, 2nd edition.
- Johnston, J.J., Boyle, K.J., Adamowicz, W., Bennett, J., Brouwer, R. et al. (2017). Contemporary guidance for stated preference studies. *Journal of the Association of Environmental and Resource Economists*, 4(2): 319-405. Doi: 10.1086/691697.
- Olmstead, S.M. (2010a). The economics of managing scarce water resources. *Review of Environmental Economics and Policy*, 4(2): 179-198. Doi: 10.1093/reep/req004.
- Olmstead, S.M. (2010b). The economics of water quality. *Review of Environmental Economics and Policy*, 4(1): 44-62. Doi: 10.1093/reep/rep016.
- Seibert, J. and Vis, M.J.P. (2012). Irrigania – a web-based game about sharing water resources. *Hydrology and Earth System Sciences*, 16:2523-2530. Doi: 10.5194/hess-16-2523-2012.
- Young, R. (2005). *Determining the economic value of water. Concepts and methods*. Resources for the Future Press. Washington, USA.

Economics Department Deferred Final Exam Policy

Deferred Final Exam Policy found at <https://uwaterloo.ca/economics/undergraduate/resources-and-policies/deferred-final-exam-policy>

Cross-listed course

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSCI cross-list will count in a Philosophy major average, even if the course was taken under the Political Science rubric.

Academic Integrity

Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. See the [UWaterloo Academic Integrity](#) webpage and the [Arts Academic Integrity](#) webpage for more information.

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (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](#). For typical penalties check [Guidelines for the Assessment of Penalties](#).

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. When in doubt, please be certain to contact the department’s administrative assistant who will provide further assistance.

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](#).

Accommodation for Students with Disabilities

Note for students with disabilities: [The AccessAbility Services office](#), located on the first floor of the Needles Hall extension (1401), 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 AS office at the beginning of each academic term.